This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

SIGILLVM · VNIVERSITATIS · CALIFORNIENSIS
FIAT LVX
MDCCCLXVIII
EX LIBRIS
Agric.-Forestry. Main Library
★ ★

SIGILLVM·VNIVERSITATIS·CALIFORNIENSIS
FIAT LVX
MDCCCLXVIII
EX LIBRIS
Agric.-Forestry. Main Library
★★

VOL. XI, PP. 135-199. FEBRUARY, 1897.

v 18

PROCEEDINGS

OF THE

American Forestry Association

AMERICAN FORESTRY CONGRESS 1882.

AT THE

Thirteenth and Fourteenth Annual Meetings,
December, 1894, and January, 1896,
at Washington,

AND AT THE SUMMER MEETINGS AT

Brooklyn, N. Y., and Springfield, Mass.

VOLUME XI.

WASHINGTON, D. C.:
1897.

GUGGENHEIMER, WEIL & CO., PRS., BALTO., MD.

NOTE.

The following interesting papers complete the publication of the proceedings of the Association to date, with the exception of a few communications which were of interest only at the time of reading. It has been necessary, in order to keep the publication within prescribed limits, to abridge some of the papers very considerably, but the editor has endeavored to preserve, as far as might be, the individuality of the author and to retain principal lines of argument as well as all statements of fact.

For convenience of reference, a subject index of the volume is included herewith.

UNIV. OF CALIFORNIA

PAPERS READ BEFORE THE

American Forestry Association

AT THE ANNUAL MEETINGS OF 1894-1895.

OBSERVATIONS ON THE DESTRUCTIVE EFFECTS OF WINDS AND THE PROTECTION AFFORDED BY WOODLANDS AND WIND-BREAKS.

By Professor F. H. KING, Madison, Wis.

We have in Wisconsin large tracts of land with soils of a light, sandy character, or sandy loam, which are now being developed for potato culture, and upon which fair yields of an excellent quality are had; but the clearing of these lands in large fields, as is now being done, has developed the fact that they are liable to serious injury from the drying and drifting action of winds.

One of these sections, at Plainfield, was visited, on May 7th, when the destructive effects in question were in progress. There had been, on the 5th and 6th, what was described as a heavy rain, but no records are kept at the place, the nearest being at Stevens Point, in the same county, twenty-one miles distant, where the rainfall on these dates was .33 and .42 inches.

The 7th was clear and cold, with a strong northwest wind, and during this and the following day, in spite of the recent rain, the fields at Plainfield and vicinity had drifted so badly that on the morning of the 8th, the loose soil, with which grain had been covered, whether with harrow, seeder or drill, had been so completely driven from many fields as to leave the kernels entirely naked, the plants lying flat upon the ground, hanging by their roots and whipping in the wind. In many other fields, where the drifting had not been so bad, the oats, which at the time stood about three inches high, were cured like hay close to the ground, and even the leaves of dock sorrel, which in places stood among the grain, were blackened and so dry as to crumble in the hand.

The drifting of soil was so bad on some exposed fields that forty, and even eighty acres of grain seeded to clover were almost completely ruined, the loose soil being removed so entirely that the marks of the bottom of the shoe-drill could be seen over entire acres of ground. But the point to which I wish to call special attention here is the fact that wherever a field lay to the leeward of any sort of wind-break, the destructive effects of the winds were either wholly avoided or they were greatly reduced. On making a careful study of the district it was found that even grass-fields and fences lying to the west and north of grain fields, had, without exception, exerted an appreciable and sometimes very marked protective influence—so much, indeed, that fields were found in the condition indicated by Figures 1, 2, 3, 4 and 5 in the chart. (Explain chart.)

Cornfields, too, drift badly at times when the corn is small or just coming up, and how full the air is of dust at these times is indicated by these two photos., both taken looking across the same field on the same day, one view being taken when there was a lull in the wind. (Show photos.)

After making these observations, the influence of the woodlands and wind-breaks in question upon the rate of evaporation to the leeward of them was studied, and in making these investigations I used a modification of the Piche evaporometer, with disks large enough to carry sheets of filter paper 5.9 inches in diameter, the water receptacles being ordinary chemical burettes graduated to tenths C. C. and having diameters of about .4 of an inch. Six of these instruments were used, and they were hung in the open air, exposed to sun and wind, at a height of one foot from the ground. The first set of observations were made on a piece of ground planted to corn, lying to the south of a grove of Black Oak having a mean height of 12 to 15 feet. The corn was not yet up, and there was at the time a gentle breeze from a little west of north, the sun shining during the time. At first the six instruments hung at distances of 20, 40, 60, 80, 100 and 120 feet from the woods, and the following table gives the evaporation during fifty-six minutes:

Station	A,	20	feet from woods	......11.0	C. C. evaporation.
"	B,	40	" " "	......11.1	" "
"	C,	60	" " "	......11.3	" "
"	D,	80	" " "	......11.2	" "
"	E,	100	" " "	......11.9	" "
"	F,	120	" " "	......12.9	" "

These results show but a small difference in the rate of evaporation until 100 or 120 feet distance is reached, but at 120 feet the rate of evaporation was 17.2 per cent. greater than at 20 feet.

Three of the instruments were next set 280, 300 and 320 feet from the grove, where the amounts of evaporation in one hour were as follows:

				Evaporation.	
Station	A,	20	feet from woods	......11.5	C. C.
"	B,	40	" " "	......11.6	"
"	C,	60	" " "	......11.9	"
				35.0	C. C.
"	D,	280	" " "	......14.5	"
"	E,	300	" " "	......14.2	"
"	F,	320	" " "	......14.7	"
				48.4	C. C.

Here it will be seen there is but little variation in the amount of evaporation at the three outer stations, but the mean evaporation at these is 24 per cent. greater than at the three inner ones.

On May 31, another trial was made to the south of a Black Oak grove 80 rods square, where the trees averaged perhaps 15 to 20 feet in height. The first two instruments hung above ground seeded last year to clover and timothy, but only timothy had come where the second instrument was placed. The remaining instruments were upon an adjoining field of oats, which at the time stood about 4 inches high. There was in progress a fair breeze from nearly due north, and the sky was clear. Here too, as before, the disks of the evaporometer hung one foot above ground. The differences in the amount of evaporation were found to be as follows:

			Evaporation.
Station	A,	20 feet	11.1
"	B,	100 "	14.3
"	C,	200 "	15.7
"	D,	300 "	18.5
"	E,	400 "	18.5
"	F,	500 "	18.3

Here it will be seen that there is an increase in the amount of evaporation until 300 feet is reached, but beyond and including this limit the rate became constant. At 300 feet the rate of evaporation was 17.7 per cent. greater than at 200 feet, and 66.6 per cent. greater than at 20 feet from the woods.

Trials were also made to the leeward of a very scanty hedge-row and of a clover field, these two sets of observations being made at the same time and at corresponding distances to the southward, the wind being rather strong, a little east of north and chilly. The sky became overcast just as the instruments were set up, and it sprinkled a very little at one time.

The scanty hedge-row was a strip of blue grass 16 feet wide, in which there were scattering black and bur oak from 6 to 8 feet in height, with a few attaining a height of 12 feet, but the distribution of these was so irregular that there were many open gaps of 20 to 40 feet. And the instruments were set up behind a clump of six trees spanning a length of 40 feet, there being a gap of about the same width on either side. North of this wind-break was a naked field 80 rods wide, being planted to potatoes at the time, across which the wind blew before reaching the hedge, while the evaporometers hung above a field of oats in which the grain was about 4 inches high.

The clover field lay adjacent to and west of the potato field, and bordering the oat field referred to above on the north, and had a width, across which the air passed before reaching the instruments, of 780 feet. The two sets of observations are, therefore, comparable, and the observed results are as follows:

	Evaporation. Hedgerow.	Clover.
Station A, 20 feet from margin........	10.3	9.3
" B, 150 " " "	12.5	12.1
" C, 300 " " "	13.4	13.0

Here, again, there is a very evident influence upon the rate of evaporation exerted by both the clover field and the hedgerow, the evaporation at 300 feet away being 30.1 per cent. and 39.8 per cent. greater than at 20 feet distant from the hedgerow and from the clover respectively. So it was 7.2 per cent. and 7.4 per cent. respectively less at 150 feet than at 300 feet for the hedgerow and for the clover.

In view of the observations here presented, it appears to me that we have in hand a case in which both the reservation of forests and the planting of trees may be urged as an expedient not only for increasing the immediate crop production, but for maintaining at a smaller cost a fair degree of fertility for the soil. In our State, and in parts of Northern Michigan, we have large tracts of land which, owing to the small natural water capacity of their soils, are, when unaided, on the verge of barrenness, and yet which are capable of producing remunerative yields of potatoes and of other crops which mature with a relatively small amount of water, but I feel confident that the tendency of these soils to drift and to suffer from drouth makes it expedient, if not necessary, to hold portions of it as forest reserves, and the observations here presented lead me to feel that were these lands to be cultivated in narrow north and south fields, leaving, and even planting when necessary, belts of timber primarily to break the force of the wind and to increase the relative humidity of the air which passes across the fields, the total agricultural output might easily exceed what would be possible were the whole surface cleared and tilled, unless irrigation were resorted to. At any rate, I can but feel that here is a practical problem which those interested in the reforesting of lands may well give serious study.

Then, again, nearly the whole timber district of the northern half of our State has now been so thoroughly deforested by man, fire and winds, that the near future must witness a large influx of agricultural population; so that if anything is to be done in the direction of forest reservations, this is the time for steps to be taken. Indeed, large land-owners already have agents in Europe negotiating the establishment of colonies within our borders, and such a colony of Finns has been so planted on the shore of Lake Superior.

WOOD-LANDS AND WATER-FLOW IN NEW JERSEY.

By C. C. VERMEULE, 71 Broadway, New York.

As consulting engineer of the Geological Survey of New Jersey, I began, in 1890, by direction of State Geologist John C. Smock, a full investigation of the water-supply resources of that State. The importance of the subject is shown by the fact that in 1894, 1,114,403 inhabitants of the State consumed an average supply of 107,840,361 gallons of water daily. My studies covered four years, and gaugings were made of several typical streams, which were compared with cotemporary rainfall measurements made by the State Weather Service. It became necessary to investigate most of the causes which affect stream-flow, and among them the influence of forests. The results of these studies are given in the Report on Water-Supply, published by the Survey in 1894. I wish to present to you here, briefly as possible, what these studies showed as to the effect of forests upon stream-flow.

In order that you may know the nature of the forests under discussion, I will say that during the progress of the topographic survey, from 1880 to 1887, a survey was made of the forested area of the State. Practically all New Jersey up-land will produce a spontaneous forest growth if left uncultivated; consequently, all up-land not cultivated or occupied by towns, was classed as forest. As we use the term, therefore, it includes all from stump and brush-land up to a good growth, 50 or 60 years old, with very little older. Although there is of late a marked tendency to acquire larger holdings, this forest is mostly held in small lots, a few of these lots being cut each year; consequently, all ages from brush up are uniformly represented. The upland area of the State being 4,494,567 acres, the surveys referred to show that, not including isolated tracts of less than ten acres, 2,069,819 acres, were in forest, or about 45 per cent. Southeast of a line drawn from Sandy Hook to Salem, this forest is nearly or all coniferous—pine on the highland and white cedar in the swamps, the latter being quite dense, but the upland timber is scattering, not usually thick enough to shade the earth. The soil is light sand and gravel.

In the northern portion of the State the forest is nearly all deciduous, oak and chestnut predominant, with hickory, beech, birch, maple, red-cedar, etc., in good proportion. This timber, being mostly held in small lots, is not extensively cut off at any given period, but the various holdings are usually cut about once in thirty to thirty-five years, this being found to be the most profitable age for chestnut. In the past there has been some cutting for fire-wood, hoop-poles and charcoal at younger age, to the injury of the growth. This practice is decreasing. The deciduous forest growth is healthy; the southern pine growth suffers much from fires. The percentage of total area in forest varies with the surface geology, being greater on the glaciated than on the unglaciated portion of the same geological formation. On the glaciated portion of the Archaean highlands, on the Kittatinny mountains, and the Tertiary pinelands of Southern New Jersey, from 80 to 100 per cent. of the whole area is forested. Kittatinny valley has less than 20 per cent., the glaciated red sandstone country 20 to 60 per cent., the unglaciated less than 20 per cent., the clay and marl country about the same. A large part of the basin of the Raritan river and most of the country drained by the branches of the Delaware below Trenton, have less than 20 per cent. of their area in forest.

There has been little change in forested areas for many years. The census shows an increase of only 330,000 acres of cultivated land since 1850. Probably for the last quarter of a century the land abandoned to grow up in forest has fully equalled in area the land newly cleared for cultivation. The economic survey of the forests now in progress indicates that the period of maximum deforestation was about 1850.

In order to have a safer basis for conclusions as to stream-flow than would be furnished by my four years' series of stream gaugings in New Jersey, all the long series measurements of flow available for streams of New England and the Middle States were collected and studied. My conclusions, consequently, apply to these water-sheds as well as New Jersey.

The following series of measurements were thus used: Sudbury river, Massachusetts, 16 years long; Connecticut river, 8 years; Croton river, N. Y., 14 years; Passaic, N. J., 17 years; Tohickon, Neshaminy and Perkiomen creeks, Pa., each 7 years; Potomac river, 6 years. These streams have from 7 to 53 per cent. of their catchments in forest. In New Jersey, in addition to the Passaic series, I was furnished a series 8 years long on the Hackensack, and measured the flow of a dozen other streams for periods of 4 years or less. These have from 13 to 88 per cent. of their catchments forested, so that the range was wide enough for safe conclusions. A difficulty appeared, however, in the fact that the percentage of forest usually varied with the surface geology, and the latter affects stream-flow to a greater extent than forests. Taking evaporation to mean the difference between total rain-fall and total run-off of the streams, the important fact was developed by these studies that the amount of rain evaporated is never directly proportional to the total rain-fall, as is often assumed to be the case. Evaporation is increased slightly for increased rain-fall, but rapidly with increased temperature of the atmosphere. Stream-flow was found to be mainly a function of rain-fall and temperature, and little or no effect upon the total yearly run-off was traceable to forests or other vegetation, or to topography. For instance, the Sudbury catchment, with 14 per cent. of forest; the Croton, with 30 per cent., and the Passaic, with 44 per cent., all having about the same mean temperature and similar topography, show the same total flow-off for a given annual rain-fall. The vegetation on the unforested portions of these catchments is much the same in each case. We find here no effect upon evaporation, from forests. The Connecticut, with 53 per cent. of forests and temperature 2.7 degrees lower, shows much less evaporation and larger flow than the above streams, but the

Potomac, with about the same forest as the Connecticut and higher mean temperature, shows much more evaporation, the latter in each case varying with the mean temperature without regard to the amount of forest. Neshaminy creek, in Pennsylvania, having 7 per cent. of its area in forest and the remainder under a high state of cultivation, shows 10 per cent. more evaporation than the Sudbury, which can only be accounted for by temperature. The Passaic and Raritan, in New Jersey, each drain a little over 800 square miles. The Passaic has 44 per cent. in forest, the Raritan 13 per cent., or nearly the same as the Sudbury. It shows 4.3 per cent. more evaporation than either the Passaic or Sudbury. The Hackensack, like the Raritan, lies on the red sandstone plain, but has 60 per cent. of forest, nearly five times as much as the Raritan, but it shows about the same evaporation—about 4 per cent. more than the Passaic, with 44 per cent., or the Sudbury, with only 14 per cent. of forest. This is exactly accounted for by the temperature. Again, the Great Egg Harbor and Batsto, streams of Southern New Jersey, have 88 per cent. of their catchments forested with pine on upland and cedar in swamps, but this large proportion of forests and small area cultivated does not prevent an increase of 14 per cent. in evaporation over that of the Sudbury, Croton and Passaic, or of 10 per cent. over the highly-cultivated Raritan catchment. The increase of evaporation is again accounted for by increased temperature and uninfluenced by forests.

I know of no more accurate way to compare the relative evaporation from forested and deforested areas, than by measuring the rain-fall and the amount of rain flowing off, provided the observations are long enough continued and begin and end with full ground-water. In this way we obtain natural conditions, and include both direct evaporation from the soil and also the water drawn up by vegetation, much of which is exhaled into the atmosphere. The loss into the earth which does not re-appear in the natural drainage channels, may, under ordinary circumstances, be neglected. This method is certainly far preferable to the attempts to measure evaporation on a small experimental scale, which have frequently been made, and the results of which are often quoted. Some of these measurements entirely neglect the large draughts of moisture made by the trees of the forest. All of them fail to obtain the same conditions which prevail naturally over large areas of forests. I am, consequently, forced to conclude, from my studies, that the effect of our New England and Middle States forests upon the total flow-off of streams, hence upon evaporation, is not important enough to be shown in the measurements of stream-flow.

A further analysis of observations on the Passaic catchment indicated that while the total average annual evaporation for an annual rain-fall of 45.00 inches was 22.70 inches, the portion of this taken up by vegetation alone was but 6.03 inches, or 27 per cent. of the whole, indicating at once the minor importance of vegetation. The powerful influence of the temperature of the air upon evaporation may be appreciated when we recall the well-known fact that the moisture which may be held in the air is doubled for each increase of 20 per cent. in temperature. Again, Mr. Desmond Fitzgerald made observations from 1875 to 1890, at Boston, which indicated an annual average evaporation from water surface of 39.20 inches, whereas, observations of rain-fall and stream-flow on Sudbury water-shed for the same years show an average evaporation from the earth's surface of 23.14 inches only. The air was, therefore, able to take up 16.06 inches more moisture from the water than it obtained from the land; hence, it is to be considered the powerful factor in determining evaporation. Again, in support of our conclusions, if evaporation is so much less from forested than from cultivated areas, as is sometimes claimed, should not forests be found thriving in full variety and luxuriance far beyond the limit where rain-fall becomes too light to support other vegetation?

Next we have to consider the effect of forests upon the greatest and least flow of streams: A careful investigation of recorded greatest and least flows per square mile of catchment, yields no results, indicative of any important effect due to forests. The maximum freshet usually occurs either when the ground is frozen and a warm rain comes on a heavy covering of accumulated snow, or else in summer, when an unusually heavy rain falls upon ground already saturated. The rate of flow-off is then mainly determined by the topography of the catchment. So the lowest flow occurs when the stream has for a long time been drawing upon stored ground-waters, and has drawn down such waters to a point far below where they can be influenced by any surface conditions. The rate of flow is then affected mainly by the capacity of the earth of the catchment for holding water and its rate of yielding up the same. It is a matter not of vegetation, but of surface geology; therefore forests can have little effect upon either the greatest or the least rate of flow of a stream.

Thus far our results are negative, but very beneficial effects were nevertheless observed from a good covering of forest upon the catchment. It became evident from these studies of stream-flow that streams were often supplied for many months entirely from water stored in the ground. For seven months in 1880 and eight months in 1881, the Passaic river was thus supplied. With only rain enough to make good the evaporation our New Jersey country will yield up in nine months ground or spring water equal to from 2.29 to 7.59 inches of rainfall. Small, barren, red sandstone catchments yield the least water, and the sand and gravel of the Tertiary formation the most. If the rain falls uniformly from two to two and one-half inches per month may be taken into the ground, and discharged thence to the streams. The entire rain-fall of an average year, less the evaporation, could be thus taken into the earth, and none need flow over the surface to the stream. Anything which affects the capacity of the earth to take up water, and the rate of discharge of the same to the stream, therefore, affects the stream-flow by making it more or less uniform through the year. If the surface is forested, a mass of absorbent humus is present; the tree roots, fallen trunks and mosses all obstruct the flow of water over the surface, and hold it until the earth can take it up. The roots increase the friability and absorbent power of the earth; the water is held and absorbed in large quantities, and slowly fed out to the streams.

Cultivation also, like forests, increases the absorbent power of the earth, and well-cultivated areas will, I find, take up as much water as forested areas. Here, however, drains are provided and water courses opened to hasten drainage of the ground-water into the streams. As a result, the discharge of streams after a rain is quicker, freshets are more frequent, the dry periods longer. This is admirably illustrated in the case of the Passaic and Raritan. The former has 44 per cent. of its catchment forested; the latter only 13 per cent., the balance being well drained and highly cultivated. Each will draw about four inches of water from the ground in nine months, but during the first three months the Raritan discharges 2.52 inches of this, the Passaic 2.10 inches, or 17 per cent. less. During the last three months, however, the Raritan discharges .70, the Passaic .87 inches, or 25 per cent. more. The Passaic, consequently, has a much more equable flow. During four years, freshets exceeding 10 cubic feet per second per square mile, occurred but five times on the Passaic, against thirteen times on the Raritan, whereas the Raritan sank below 2 cubic feet per second per square mile, an average of 271 days each year; the Passaic only 245 days. While in the case of these particular streams this result may be due partly to surface geology, the same facts were observed throughout the list of measured streams. Those having the largest proportions of forest upon the catchment invariably show the best sustained dry season flow, although the total run-off is no greater.

Our Southern New Jersey streams have the most forest, and are remarkably steady, the dry season flow averaging double that of the northern rivers. This is undoubtedly due in large part to the great absorbent power of their sandy catchments, but a critical study of their daily flow reveals the important contribution of the cedar swamps to this result. Should these be cut off the streams would suffer, becoming much more unreliable.

It will be seen that as between cultivated and forested catchments, therefore, our gaugings indicate the same total run-off for a given rain-fall, but a much more uniform discharge, fewer floods and shorter dry periods on the forested areas. Forested streams are consequently more valuable and reliable for water power, and for water-supply they require less storage reservoir capacity to provide for a given daily draught. The waters are also much less likely to become muddy or otherwise contaminated.

The worst condition of all for a catchment is barrenness. Barren earth is non-absorbent; the water fails to penetrate it and oxidize its fertilizing constituents. Heavy rains run over the surface, washing off all of the loose material, and barren conditions once inaugurated perpetuate themselves. There is always danger of such conditions setting in when slopes or other areas unfit for cultivation are deforested. There is a special danger of it where forest fires are prevalent. The effect of barrenness upon stream-flow is to produce flashiness. We have a few small red sandstone areas in New Jersey in this condition. The streams dry up for weeks in succession, to become torrents when rain falls in considerable quantity. As compared with barrenness, cultivation is harmless to the streams. Our aim, therefore, should be to keep all unfit for cultivation clad with forest.

Such are the effects of forests on stream-flow indicated by the most accurate stream-gaugings available for New England and the Middle States. While they fail to indicate any effect upon evaporation, or upon the very highest or very lowest rate of flow, they do show what is quite as important, a more equable flow, fewer floods, and shorter periods of extreme low water upon well-forested catchments.

THE CONSERVATION OF SOIL AND WATER SUPPLY OF HILL COUNTRIES IN CULTIVATED AREAS.

By THOS. J. MCKIE, M. D., of Woodlawn, S. C.

The striking remark of Humboldt—"How foolish do men appear, destroying the forest cover without regard to consequences, for thereby they rob themselves of wood and water," was never more applicable than it is today in so far as concerns my own State, particularly the middle and upper counties lying in or above the granite belt. Here the surface is for the most part hilly, and the soil composed of a thin sandy loam with a substratum of rock or clay more or less nearly approaching the surface, and affording a most favorable field for the wasting influences of the heavy rains which are frequent and often destructive to both soil and crops in that otherwise favored region. It is here that may be seen the wildest display of this foolishness of men who are invited to the little less than criminal destruction of the liberal productiveness of this virgin soil which yields abundant crops with little labor and small risk, either from unfavorable season or careless culture. And but for the prodigality of nature which is so abundantly displayed in the rapid reproduction of other though less effective covering to the soil, the latter portion of Humboldt's proposition would already have been proven in many sections of this favored land.

The treatment of the surplus rain-water is perhaps deserving of quite as much attention as forestry proper, and is equally important in considering the husbandry of our water supply, itself inseparably connected with the consideration of the question of forestry.

The deforested and despoiled fields, though blotted out from any directly productive consideration, are yet the chief factors in the problem of reduced water supply and excessive overflow, with most of the dire consequences resulting therefrom, and to that extent, at least, should become an adjunct to our forestry system and receive a share of our attention.

In the cotton-belt the idea has long and generally prevailed, and has been extensively practiced, that it is a poor plantation on which enough cannot be produced to buy another with. Cut down and wear out, and cut down a second field or farm while the first is being exhausted, the forest being considered an incumbrance rather than a treasure, as it costs both time and labor to remove the timber, valueless by reason of its abundance. Such has been the effect of this destructive policy that today many sections of this highly favored country are barren of primeval forests, the place of which has been taken by broom sage, gullies or Old Field Pines, which have such firm hold that reclamation is well nigh hopeless as to most of it. To the treatmen of land of this description it is desired to call more particular attention.

Each State has its laws for the protection of the citizen, for preserving health, laws against cruelty to and maltreatment of animals and laws to protect the land and forest from his neighbor, but none that I am aware of to protect the land or forest against the owner himself, while nearly all of health, happiness and prosperity depend largely upon this protection. Government ownership is not, perhaps, the best way of accomplishing this, neither can unrestrained license, even with his own, protect a man against himself. When he begins to use, or rather abuse, his liberty in a way detrimental to posterity, the time has arrived for the interference of law. A system or rewards and penalties might be enacted by the Legislature of each State by which this wise purpose could be accomplished. For the best protected farm in each county of any given State a premium might be offered proportionate to the value of the farm itself. For neglect of this protection a penalty should attach for injury done either to the public or individual by such neglect. Taxes on forests might be remitted as a further inducement to their preservation. While it is the pabulum furnished by nature to both vegetable and animal kingdoms, water is also the great destroyer which takes away much of the wealth of the world. With proper attention from States and individuals, the evils arising from floods and freshets may be controlled or greatly mitigated.

The washing of hillsides, the overflow of bottoms, begin with the first accumulation of water at the tops of the hills, and here is the place to begin to correct or check the evil which is in proportion to the accumulation. To accomplish this, two things are necessary: The one is by horizontal culture to diffuse the water as much as possible, cause it to spread out, and cover as much surface as may be, and thus weaken its force at any given point and cause the excess to pass through rather than over the soil. The second is not unlike the first—retard the surface flow by a thorough system of terraces, which, when properly arranged, give on each hillside a succession of levels from top to bottom, effectually preventing excessive accumulations of water at the bottom. By stretching a line between any two points at top and bottom of any given declivity, and then drawing a succession of angles along the same line, like a staircase, you have an apt illustration of the idea intended to be conveyed. The advantages gained by this method will at once become apparent: The soil is saved by reduction of gravity, the arrest of the downward sweep of water and soil, and the increased time in descent allowed in the delay for a deposit of surface soil while being carried downward towards the valleys and streams below. It is not difficult to understand how this retardation may be thus accomplished, or to conceive of its advantages when extensively applied. Delays, therefore, are not always dangerous, but in this case highly salutary. Having opposed these obstacles to the flow of surface water, and at the same time having well provided against accumulations, both at the top of the hill and along the entire declivity, we are better prepared to deal with the excess or overflow which must eventually reach the bottom. Here, as the question appears to me, other and yet graver errors have been committed in the management of farms, and still more in the diminution of the evils of floods and freshets. It is believed to be ruinous, as it is unwise, to even attempt to confine these overflows within the limits of an ordinary ditch or embankment. Experience has fully established the fact that sooner or later water will find its way through or over these at some point or other, and all who have ever visited a hill country can bear testimony to the ravages which have resulted. To remedy this evil, old ideas must be abandoned. It is not to be understood that drainage and ditching is to be ignored or dispensed with; on the contrary, both should be practiced more extensively in order to carry out more fully the leading idea of diffusion and delays. Ditches through low land, creek and branch bottoms, are a necessity for drainage and successful cultivation. In cutting a ditch the mistake of piling earth to increase its carrying capacity should be avoided. Like water, it must be spread out over the surface of contiguous land. Overflow, then, must be accepted as a necessity, and should be utilized as a benefaction to the soil they cover as a conveyor of fertilizers derived from water and silt. The wise farmer will use every legitimate means to retard the current of overflows through his premises. The means by which this may be accomplished after the excess has reached the bottom, as it appears to one who has given time and thought to its study and practice, may be made more apparent by picturing to the mind a piece of bottom land through the lowest part of which there runs a central ditch by which the ordinary flow of water is conveyed, this being without side elevation or embankment reaching above the common level of the contiguous land, field or pasture, as the case may be. Running into this from both sides and at suitable distances, which should be regulated by the prevailing fall of the main ditch, and extending back to a terrace at the foot of the adjoining hill, cross ditches giving fall enough to avoid stagnation are made, with the earth taken from the ditch evenly distributed on its lower side and raised high enough to prevent overflow. By this arrangement it will be perceived that the entire bottom is for the time being given up to the occupancy of the body of water which diffuses itself evenly over the surface of the soil between these cross sections and embankments, giving time to throw down a portion of its rich sedimentary deposits, and so delayed in its downward course as to reduce the damage of overflow to a minimum while enriching the soil at the same time. Timbers may be made to take the place of these cross ditches when convenient or plentiful. In preventing or staying the waste of cultivated land the necessity of clearing new fields is to that extent obviated, and to an equal extent the forest is spared. The unsightly aspect of galls and gullies is remedied, the cultivation of the soil is made easier, it wears longer and produces more abundantly, thus making a step towards intensiveness. It also utilizes the waste of the hills to build up the valleys. Still another and scarcely less important consideration is not to be lost sight of in dealing with hill farms and forests. If every farmer living on the water-shed of a given river will go earnestly and industriously to work to constitute himself a true husbandman in saving his own possessions, in getting the very most of every shower of rain in the way this paper indicates, we will hear less of the ravages of freshets and less of the evils of drouth. He will at the same time place the strongest possible barrier between the occupants and industries of river borders and the dangers of freshets. No one will fail to see the benefits which must arise from such a system or doubt the means when applied as preventives for cures of the many evils which now threaten the prosperity if not the life of our common country.

THE ADIRONDACK FOREST.

By Mr. Verplank Colvin, Albany, N. Y.

It is nearly twelve years since, by request of the then Governor of this State, I addressed the first American Forestry Congress, at the first meeting in Cincinnati. At that time the presence of Governor Cornell and Ex-Governor Seymour (both earnestly interested in forestry) had been hoped for, but the official duties of the one and the delicate health of the other prevented their attendance. Many of the practical questions of governmental forestry were then matters of doubt, if not of dispute.

Even the propriety or feasibility of State care of forests was questioned by some public men; but the demand of the people for forest preservation has enforced the trial of administrative plans. The legislation establishing the Adirondack Reserve is so recent and accessible in the statutes that it need not be recited. Your request that I should address you means that you wish me to communicate some of my personal observation and knowledge relative to the great Adirondack forest acquired during the quarter of a century that I have devoted to the surveys in this region.

Shall I tell you of these forests as they were? As they are? As they should be?

As they were when I began the exploration of the remote portions of the wilderness at the close of the civil war—I cannot think of them without regret for their then grandeur and beauty. At the close of the civil war the Adirondack region was a wonderful forest—a cathedral of trees. A great portion of the forest was then practically unknown. Its thousand lakes were supposed to number only one or two hundred. Whole valleys and mountain ranges of primeval forest existed—yes, valley after valley, and range after range—which had never echoed to the sound of a lumberman's axe. The moose was not yet extinct. The wild trumpeter swan sunned his snowy plumage on the shallows of the northern rivers. The wild pigeons, in flocks that darkened the sky, made here their nesting ground, breaking the limbs from the trees by the weight of their tumultuous masses. Eagles, hawks and owls fattened on rich food. Partridges or ruffled grouse and the black or Canada grouse, and other rare and beautiful birds, were here. The beaver cut down trees and built log dams and houses of brush and mud. Wolves, bear and panther were frequently met with, the wolves, indeed, so audacious and dangerous as to venture out into the settlements, killing sheep and howling near the cabins of frontiersmen. The true source of the Hudson river was unknown, and other Adirondack rivers were indicated upon maps by dotted lines, representing a "supposed course" of the stream. So wild, so magnificent, so untouched and unknown was the interior of this great forest as late as 1865.

Forests of majestic pines yet grew upon the banks of the Upper Hudson. The pine was yet the chief sought timber of the lumbermen. Magnificent trees, towering above all the forest, stood masters among the dark spruce and Hemlock forests, which, below, were embowered in unbroken masses of hardwood or deciduous timber. The lake shores for miles were symmetrically margined with perfectly-formed forests of Arbor Vitate (the "white cedar" of hunters and guides). The great Sphagnum swamps were decorated with dark-green Balsam trees, surprisingly uniform in shape, as though trimmed by artifice of man to the form of spires of innumerable chapels. Except near settlements, forest fires had left hardly a scar on the sides of the richly-timbered mountains. There were no railroads in the Adirondacks in those days, nor on either side of it. Even the shores of Lake Champlain and the valley of Black river had yet to hear the roar of the railway train. Stages, as open wagons were called, went to some settlements on the borders of the forest once or twice a week. These "stages" traveled night and day on a journey over fearful roads, and the wearied traveler felt happy that only one day in the week was stage day. Corduroy roads, rudely made of logs, rarely having any covering of earth, were the causeways through the swamps, and over the hills the wheels struggled with huge boulders for the right of way. Each stage driver had his axe, for trees, fallen across the road, had frequently to be cut away.

I remember, in 1870, traversing the new road from North river to Indian lake, then recently opened. It was October. On either side was a dense forest of trees of enormous size.

Between these was only the single track of the new road, so deeply sunken into the soft "wooden soil" as to reach the hubs of the vehicles. At 2000 feet above the sea the pines had mostly given place to the Black Spruce and Balsam, decorating a leafless forest of gigantic Yellow Birches and huge Beech trees. The mightiest Hemlock trees were dwarfed by comparison with the great uplifted columns of the spruces, and the rough, scaly trunks of those Yellow Birches supported topmost branches which fairly swept the clouds.

Six years later I passed that way again. Only by the topography could one recognize the country. The great trees were chiefly gone. Forest fires had followed the axe, and tall, blackened columns—the lofty and horrible head-boards of the dead forest—were the chief reminder of what had been. Bad management, or lack of management, had permitted this section of the great forest to be destroyed, for the giant hardwood trees had not been cut or lumbered. They had been wasted by fire because there was no one to save them or prevent it. It is not known how these fires originated. It is more likely from hunters' camp-fire than from a lumberman's carelessness. However it happened, they are gone! There was no forest management.

Ten years more pass away. The dead and blackened trunks of the old forest have mostly fallen or are more solitary, and have grown gray with many winters of exposure to the storms. But the area of burnt forest has increased vastly. How or why no one can explain or understand. Hundreds of square miles are now bare of forest, showing the rough, grizzly ledges of native rock. At midsummer, here and there, columns of smoke are seen to rise one mile, three miles, ten miles away—a dozen of them—where there is still forest, and you are told "some hunter has made a smudge," or "probably someone with a shotgun and wadding of paper" has unconsciously fired the forest.

Such is the Adirondack forest as it was and as it is in the lowlands and accessible portions—chiefly lumbered over now, and the remnants in many places burnt away. Yet in the interior and mountain districts there remain vast sections still untouched by lumbermen and undevastated.

It was in a remote interior valley, where the symmetry and beauty of the forest was most remarkable, a region free from underbrush, with beautiful, open, sunshiny glades, naturally planted with clusters of small but well formed evergreens, where crystaline trout streams led through dark forests or wild meadows to beautiful lakes, that I first (thirty years ago) thought of the Adirondack park and forest reserve. Since then I have urged it, written of it, spoken for it, and today it is a reality.

In my report to the Legislature on the Adirondack Survey in 1873, I especially urged the acquisition by the State of those forests at the sources of the Hudson, which include the high Alpine district of our mountains.

This portion of the Adirondack forest is unique. The spruce, the balsam, the birch, which grow in such dense forests upon these Alpine slopes, had they memories, could tell of days when George the Third was King; when Washington was unknown; perhaps of times before either Indian or white man had climbed these peaks. Yet these trees are scarce three or five feet high, but aged and gray—the patriarchs of the forest—spreading out their interlaced boughs, matted together in impenetrable chaparal, where the explorer must walk upon the tree-tops if he climb at all. Higher the air is thin, and cold and piercing. A mile above sea level the forest trees have shrunk to shrubs. Arctic willows, Lapland lichens and Greenland mosses and small boreal plants are the only evidences of plant life that remain.

But in the deep valleys, half a mile below, where the white billows of the clouds go floating, are forests where, if the trees are small, they are, nevertheless, densely set, twenty-five feet in height, but scarce a foot apart, so close at times that a dog can scarce make his way among them, while the ground is one mass of humus soil, soaking with rain and the moisture of the clouds, frequently knee-deep with bright green sphagnum—a peat moss so soaked and saturated with water as to justify the name of hanging-lakes to these mosses on the mountain sides.

This is the Alpine and Sub-Alpine forest, the preservation of which I so strongly recommended in my report of 1873 and since.

This section of the forest has not greatly changed. The lumbermen have penetrated into the upland valleys, but have not reached any of the high peaks. Only the large timber has as yet been taken. In 1873, between the Schroon and Raquette rivers, North Elba and the Boreas or Old Carthage road, there was nearly 500 square miles of primeval forest. There still remain nearly 100 square miles of these Adirondack Alps unharmed by the fire or by the axe. This, with the Whiteface mountain district, preserved by a private club or association, covers nearly all the Alpine forest of New York, but this Mount Marcy district has chief value as containing the sources of the Hudson.

There should be no delay now in the preservation of this rare forest and its springs of living waters.

Of the forests of the lake region, it may be said that of those located above 1500 to 1700 feet above the sea, the choicest portions are now either in the hands of the private parks or clubs, or of the State. This is the chief region of timber and game. At Raquette lake, at points on the headwaters of Moose river, are sections of forest which no lumberman has yet cut—as wild in places as when Columbus discovered America.

In the discussions which led to the establishment of our forest preserves one of the chief arguments used was the ultimate value to the State of the timber upon these lands as a reserve for forest administration. The general agreement of high authority and experience appears to be in favor of the utilization of the already lumbered districts of the forest, so far, at least, as to meet the expense of their maintenance, if not of their cost. Yet those tracts of wild and picturesque forest, including the larger lakes, like the Raquette, the Saranac or the Au Sable, especially those sections which have never been lumbered, can be preserved intact as a memorial and evidence of the ancient forests, and the application of the European system may be confined to those natural lumbering districts in the border of the forest which have already been cut over, but have now a new growth of merchantable timber upon them. The taxes of this State may perhaps ultimately be lightened to the extent of $2,500,000 per annum from the present deforested border lands of this region, now nearly bare of timber.

Let the forests be restored on the burnt and barren districts of the Adirondacks and scientific lumbering be confined to these border tracts which have been cut over again and again, which appear to be natural lumbering districts. Let the primeval, untouched forests of the remote interior and Alpine district ever remain inviolable, and New York will possess a forest magnificent in its ancient grandeur, practically useful—the safe health resort of thousands yet to come.

THE FORESTRY LEGISLATION OF NEW HAMPSHIRE.

By Prof. James F. Colby, Hanover, N. H.

Legislation for the protection of the forests of New Hampshire is recent in origin, tentative in character, and small in volume. The reasons for this are found in the economic history of the State. When white men began their settlements within its present borders, New Hampshire was covered with a dense forest of finest timber. Apparently the only unforested areas were a few sedgy swamps, a few Indian corn fields, and the higher elevations of the White mountains. The white men came, not to remain hunters and fishers, but to subdue this wilderness and to establish an agricultural and industrial commonwealth. Trees were no less an obstacle to this end than granite boulders. The first step, therefore, to the economic advancement of the successive bands of settlers who pushed their way from Dover, Portsmouth and Exeter into the central and western portions of the State toward the middle of the last century, and finally to its northernmost border, soon after the close of the Revolution, was the felling of forests to make room for farms. So gradually was this done, that it was not until the close of the rebellion, during which the State sold for a mite the last of its public domain, that any apprehension appears to have been felt lest too much of the forest of the State might be removed, and the proper economic proportion between its tillage land, its pasture and its forests be disturbed. Slowly this apprehension has spread, and with it has come a demand for forestry legislation. The large dependence of the growing manufacturing interests of the State upon the supply of water power and the Report of the Commissioners on the Preliminary Examination of the Water Power of New Hampshire, published in 1870, emphasized this demand, though it was not until 1881 that the State instituted an official inquiry into its forest resources. So far, all its legislation upon this subject has been simple and experimental, though during the past fourteen years the State has instituted three commissions to make investigations into its forestry conditions, which may give the material upon which to base a more elaborate and definite code of forestry law.

The legislation which has thus far been adopted is limited to the following subjects:

Protection Against Forest Fires.

The more general provisions relating to this subject are found in the Public Statutes, 1891, and are as follows:

"Towns may make such by-laws respecting the kindling, guarding and safe-keeping of fires, and for removing all combustible materials from any building or place, as the safety of the property in such town may require; and may appoint in such manner as may be be prescribed in such regulations, all such officers as may be necessary to carry such regulations into effect, and affix penalties not exceeding ten dollars for any offense, to be recovered in such manner and to such use as the town may direct." (General Laws, chap. 47, sec. 8.)

"If any person shall willfully and maliciously burn any stack of corn, hay, grain, or flax, or any fence, or pile of boards, lumber or wood, or any trees or underwood of another, he shall be imprisoned three years, or fined not exceeding one thousand dollars and imprisoned not exceeding one year." (Chap. 277, sec. 3.)

"If any person, with intent to injure another, kindles, or causes to be kindled, a fire on his own or another's land, and thereby the property of any other person is injured or destroyed, he shall be fined not exceeding $2,000, or imprisoned not exceeding three years." (Chap. 277, sec. 6.)

"If any person shall kindle a fire by the use of firearms, or by any other means, on land not his own, he shall be fined not exceeding ten dollars; and if such fire spreads and does any damage to the property of others, he shall be fined not exceeding one thousand dollars." (Chap. 277, sec. 4.)

"If any person, for a lawful purpose, shall kindle a fire upon his own land, or upon the land which he occupies, or upon which he is laboring, at an unsuitable time, or in a careless and imprudent manner, and shall thereby injure or destroy the property of others, he shall be fined not exceeding one thousand dollars." (Chap. 277, sec. 5.)

"Whoever shall inform the prosecuting officers of the state of evidence which secures the conviction of any person who willfully, maliciously, or through criminal carelessness has caused any damage by fire in any forest, woodlot, pasture or field, shall receive from the State a reward of one hundred dollars. The State treasurer shall pay the same to the informer upon presentation of a certificate of the attorney-general or solicitor that he is entitled thereto." (Chap. 277, sec. 7.)

"The proprietors of every railroad shall be liable for all damages which shall accrue to any person or property by fire or steam from any locomotive or other engine on such road." (General Laws, chap. 160, sec. 29.)

The court has held that this law makes the liability of railroads absolute like that of insurers, and that the concurring fault or carelessness of the plaintiff, in leaving combustible litter scattered about his premises, or in leaving his property in an exposed situation, furnishes no excuse or defense in case of such burning.

To the above statute provisions may be added the common-law doctrine, that anyone who, by carelessly kindling or negligently tending and guarding a fire upon his own land, causes injury to the property of another, by the escape of such fire, is liable in damages to the extent of the loss inflicted.

The comment of the Commission of 1885 upon these statutes now requires little amendment, and may here be abridged. (See Report of Foresty Commission for 1885, pp. 95-96.)

That Commission expressed its doubt, in which their successors will concur, whether the statutes above quoted have had any appreciable effect in curtailing the number or destructiveness of forest fires since they have been in force. The first of these statutes, though capable of wider application, always seems to have been regarded as intended only for the protection of buildings and property in the compact parts of towns. Instances are few, if any, in which it has been applied to the protection of woodland or forest. Even if so applied, this statute must prove inadequate because it allows local option, and forest fires require uniformly rigid treatment.

No conviction under any one of the four sections quoted from Chapter 277 of the Public Statutes has come to our knowledge. It was the unofficial opinion of a distinguished Justice of the Supreme Court of New Hampshire, lately deceased, Hon. William S. Ladd, that this was due to the popular judgment that the offense involved no atrocity, to the difficulty of its detection, and to the lack of adequate reward for the performance of such service.

The above statute relating to railroads is deemed by competent judges to have stimulated these corporations to take due care against causing or spreading forest fires. The common-law liability above described has been effective in restraining persons of pecuniary liability in the use of fire upon their own premises. Suits by injured parties to recover the damage thus caused are of frequent occurrence, and are often successful. (See Report of Forestry Commission, 1885, pp. 95-97.)

Despite these provisions of law, statutory and common, both the first and second Forestry Commissions recommended the adoption of more stringent laws for protection against forest fires. In 1893 the Legislature first acted upon these recommendations, and (An Act for the Establishment of a Forestry Commission) enacted the following:

> "SECTION 3. The selectmen of towns in this State are hereby constituted fire wardens of their several towns, whose duty it shall be to watch the forests, and, whenever a fire is observed therein, to immediately summon such assistance as they may deem necessary, go at once to the scene of it, and, if possible, extinguish it. In regions where no town organizations exist the county commissioners are empowered to appoint such fire wardens. Fire wardens and such persons as they may employ shall be paid for their services by the town in which such fires occur, and, in the absence of town organizations, by the county."

Two years' experience has convinced the present Forestry Commission that this law must prove ineffective. That Commission, in its report for 1895, pp. 35-36, says:

> "There is little fault to be found with the manner in which the selectmen of towns have discharged their duties as fire wardens, and that part of the law which clothes those officials with the power to protect the forests of their towns against fire, appears to require only slight modification. That part of the law, however, which relates to the protection of the great forested areas, which are found in the unincorporated townships of the northern counties of the State, should, in the opinion of this board, be amended. The provision by which county

commissioners were empowered to appoint fire wardens for places where no town organizations exist has been wholly inoperative, and, despite the frequently renewed and often vigorous and personal protests of this board, not a single fire warden for such places has been appointed under the provisions of that act.

"Thus what appears to us to have been the plain intent of the framers of that act has been nullified by the neglect of the county commissioners to give effect to its only administrative feature. The only excuse given for this neglect, so far as we know, is that the cost of protecting these areas of forest ought not to be borne by the county, but that it is the duty of each man to protect his own forest."

To supply the defect thus discovered in the administration of the law, the last Legislature, by an act of March 29, 1895, provided as follows:

"SECTION 1. It shall be the duty of the forestry commission, upon application by the owner or owners of any tract of forest land situated in a locality where no town organization exists, to appoint a suitable number of special fire wardens for said tracts, to define their duties, to limit their term of employment, and to fix their compensation. The expense attending the employment of said special fire wardens shall be borne one-half by the party or parties making the application for their appointment and one-half by the county in which said tract of land is located.

"Approved March 29, 1895."

The territorial area of Northern New Hampshire, in which no town organization exists, is relatively large, and much of it is heavily timbered. Hence the enactment just quoted, if wisely administered, promises a larger measure of protection than has ever before been supplied against the ravages of forest fires in the localities where it is most needed.

Investigation of Forestry Conditions.

In order to obtain information to serve as a basis for forestry legislation, the State has authorized the appointment in succession of three Forestry Commissions. The first temporary Forestry Commission was authorized by the act of June 29, 1881, which provided that:

"The Governor, and such associates as he may appoint to act with him, are hereby constituted a commission to institute an inquiry into the extent to which the forests of New Hampshire are being destroyed by the indiscriminate cutting of wood and timber for transportation to other States; also, the effect, if any, produced by the destruction of our forests upon our rainfall, and consequently upon our ponds and streams, and into the wisdom or necessity for the adoption of forest laws."

This Commission, which expired by limitation in two years, was by the act of September 15, 1883, extended for an additional term of two years. Its report, submitted to the Legislature in 1885, treated of the five following subjects:

1. Forest areas.
2. The forests of New Hampshire in their relation to the amount of rainfall, the water supply, and the climate of the State.
3. The trees and shrubs composing the New Hampshire forests, their distribution, relative abundance, and utility.
4. Forest management and reforesting.
5. Forest fires.

It is not improper to add that this report is one of the most valuable of those that have been made upon this subject in any State of the Union, and that the subsequent Forestry Commissions of this State are greatly indebted for the thoroughness with which this investigation was conducted. But public interest was not yet awake to the necessity of further specific legislation for the protection of the forests. The gradual encroachment of the lumberman's axe upon the White mountain forests, several destructive fires along the lines of summer travel in that region, and the realized close dependence between water supply and the growth of our manufacturing interests contributed to keep alive agitation and sufficed to lead to the establishment of a second temporary Forestry Commission. This Commission was appointed in accordance with the act of August 16, 1889, which reads:

> "WHEREAS, The preservation of the forests of New Hampshire is essentially necessary, not only for the prosperity of our vast manufacturing interests, but also to preserve and increase that natural beauty of scenery so attractive to our visitors; and
>
> "WHEREAS, The hills and mountains in this State are being rapidly denuded of timber and rendered unsightly by the acts of private parties owning the same; therefore,
>
> "*Resolved*, That the Governor, with the advice of the Council, is hereby authorized and empowered to appoint a commission consisting of three able and discreet men, who shall examine and ascertain the feasibility of the purchase by the State of the whole or any portion of the timber lands upon the hills and mountains in the State, near summer resorts, or bordering upon the principal sources of the water supplies needed for manufacturing purposes, with the view of preserving the same as public lands and parks, and report their finding to the next session of the Legislature."

The report of this Commission, presented to the Legislature in 1891, was based upon a careful examination of the mountain regions of the State, and contained in its first half an analysis of the functions of mountain forests, under four heads:

1. The preservation of the mountains themselves by clothing them with soil.

2. The supply of timber.

3. The formation in the soil of natural storage reservoirs for the retention and distribution of water.

4. The production and maintenance of such conditions of the soil, water, atmosphere and scenery of the region as are highly favorable to human life, health and enjoyment.

And in its second half statistics and discussions relating to the leading natural resources of the State, its agriculture, timber supply, manufactures, the attractions of its scenery for tourists and summer visitors, the railroads in the State, roads and paths, forest fires, and the inter-dependence of our leading industries.

This Commission recommended:

1. That the large expense involved in the condemnation by the State for public purposes, by the exercise of the right of eminent domain, of very extensive areas of its mountain forests, and the undefined limit of the legislative power to authorize the same, render it unwise for the State to proceed far in that direction, and that it confine its action to tracts of small extent, and to those whose condemnation is undoubtedly demanded by the public welfare.

2. That a permanent Forestry Commission be appointed, whose duties should be substantially those now prescribed (An Act Establishing a Forestry Commission, 1893) for the existing Commission.

3. That the penalties for the careless or wilful firing of woods or forests be increased, and that the selectmen of towns be constituted fire-wardens for their respective towns, and that in localities where no town organizations exist county commissioners should act as fire-wardens.

These recommendations respecting fire-wardens also were embodied in the act above cited of 1893.

This second temporary Commission appointed for two years was, by the act of April 10, 1891, extended for an additional term of two years. Its second report, submitted to the Legislature in 1893, contains an extended discussion of the various phases of the forestry question in its relations to the permanent interests of the State, and concludes by suggesting the following remedies to prevent the further squandering of the forested wealth of the State:

"1. That, as favorable opportunities offer, the State should purchase of their owners such tracts of denuded land as it may be deemed advisable for the State to acquire, and forever after hold and manage them in such manner as the general interests of its people require.

"2. That, as favorable opportunities occur, the State should purchase of their owners tracts of forest from which all trees of a stipulated size have already been or may be subsequently removed by the seller; said lands to be forever after held and managed by the State in such manner as the general interests of its citizens require.

"3. The resumption of ownersip by the State through the exercise of its right of eminent domain, of important tracts of land, like mountain passes and mountain summits, to be forever after controlled by its government, and devoted to the enjoyment of the public.

"4. That, as favorable opportunities occur, the State should purchase of the proprietors of such forest property as it may wish to control, agreements restricting the owners and their heirs, administrators, and assigns, forever, to cutting of such trees only as are above a stipulated size."

The third, and present Forestry Commission, was intended to be permanent. It was constituted in accordance with the recommendations of the second temporary Forestry Commission, outlined in its report for 1891. The act establishing this present Commission, approved March 29, 1893, provides that the Commisison shall consist of the Governor, *ex officio*, and four other members, two Republicans and two Democrats, who shall be appointed by the Governor, with advice of the Council for their special fitness for services on this Commission, and be classified in such manner that the office of one shall become vacant each year.

"SECTION 2. It is the duty of this commission to investigate the extent and character of the original and secondary forests of the State, together with the amounts and varieties of the wood and timber growing therein; to ascertain, as near as the means at their command will allow, the annual removals of wood and timber thereupon and the disposition made of the same, by home consumption and manufacture as well as by exportation in the log; the different methods of lumbering pursued and the effects thereof upon the timber supply, water power, scenery and climate of the State; the approximate amount of revenue annually received from the forests of the State; the damages done to them from time to time by forest fires, and any other important facts relating to forest interests which may come to their knowledge."

Some of the investigations prescribed by the above enactment have been made; others are in progress. A statement of the results of the former has been submitted to the Legislature in the Forestry Reports for 1893 and 1894.

The law creating the first Forestry Commission provided that its members should serve without compensation or expense to the State; the law creating the second Commission authorized the payment out of the treasury of the State of $1000, or so much thereof as might be necessary for the payment and services of said Commission; the law creating the third Commission provides that one of said Commissioners shall be elected by his associates secretary of the Commission and receive a salary of one thousand dollars per annum. The other members shall receive no compensation for their services but shall be paid their necessary expenses incurred in the discharge of their duties, as audited and allowed by the Governor and Council.

The laws creating these Commissions have required that they make reports to the Legislature, and that these reports be printed for distribution. The information thus supplied to the Legislature was needed before that body could act with adequate knowledge of the evil alleged to be done by forest fires and the lumberman's axe. Now only the rise of a strong public opinion demanding the adoption of more scientific forestry seems to be needed to secure further enactments.

Public Parks.

Since the beginning of the forestry agitation in New Hampshire numerous plans have been suggested for the acquisition by the State of the whole or some parts of the White mountain region, and occasionally of some outlying mountain peaks, and their dedication to the uses of public parks. The large pecuniary outlay which such reservations would involve, and the unwillingness of agricultural communities to increase their present undue burden of taxation for what many of them would deem the especial benefit of the leisure classes, who during the summer flock to the mountains from town and city, have thus far prevented the establishment of such reservations. Their utility as object-lessons in scientific forestry also is appreciated by few. Still a beginning of such legislation was made in 1893. The Legislature then enacted (An Act for the Establishment of a Forestry Commisison, Sec. 4) that:

> "SECTION 4. Whenever any person or persons shall supply the necessary funds therefor, so that no cost or expense shall accrue to the State, the forestry commission is hereby authorized to buy any tract of land and devote the same to the purposes of a public park. If they cannot agree with the owners thereof as to the price, they may condemn the same under the powers of eminent domain, and the value shall be determined as in case of lands taken for highways, with the same rights of appeal and jury trial. On the payment of the value, as finally determined, the land so taken shall be vested in the State and forever held for the purposes of a public park. The persons furnishing the money to buy said land shall be at liberty to lay out roads and paths on the land and otherwise improve the same under the direction of the forestry commission, and the tract shall at all times be open to the use of the public."

Thus far no persons have furnished sufficient means to enable the Forestry Commission to exercise the beneficial power thus bestowed.

Arbor Day, Shade Trees and Forestry Meetings.

Arbor day has not been made a legal holiday in New Hampshire, but its observance has for several years been invited by official proclamation, and its observance is becoming customary, especially by the public schools.

The legislation of this State in relation to the planting, cultivation and protection of shade and ornamental trees requires only briefest mention. The Public Statutes, Chap. 40, Sec. 9, state that "towns shall have control of the shade and ornamental trees situated upon any lands within the limits of the town appropriated to public uses, and may make regulations from time to time for the planting, protection and preservation of such trees." Chap. 50, Sec. 10, gives like power to City Councils. Chap. 59, Sec. 13, allows an abatement of taxes to any person who shall plant and protect shade trees upon any highway adjoining his land. Chap. 81, Sec. 5, forbids the stringing of wires to the injury of shade trees without the consent of the owner, unless upon order of the selectmen, after hearing, and Chap. 147, Sec. 1, authorizes the formation of corporations for "the planting, cultivation and protection of shade, ornamental and forest trees." This legislation was supplemented by an act approved March 28, 1895, which provides that:

"SECTION 1. The mayor and aldermen in cities, and the selectmen of towns, are hereby authorized as hereinafter provided in this act, to designate and preserve trees standing and growing in the limits of highways, for the purposes of shade or ornament, and to designate not more than one such tree in every sixty-six feet where such trees are growing, and are of a diameter of one inch or more.

"SECTION 2. Said mayor, and aldermen, and selectmen shall at such seasons of the year as they deem proper, designate such trees as are selected by them for the purposes set forth in this act, by driving into the same, at a point not less than four nor more than six feet from the ground, and on the side toward the highway, a nail or spike with a metallic washer, hung thereon, on which shall be stamped the seal of the State of New Hampshire, together with such numbers or figures as will enable said officers to keep a correct record of said trees. Said washer shall be procured by the secretary of the Forestry Commission, and furnished by him to said officers as may be required by them for the purposes of this act. But nothing in this act shall prevent said officers from removing said trees whenever in their opinion the public good requires it. Said mayor and aldermen, or selectmen, shall at least once each year renew such nails or spikes and washers as shall have been destroyed or defaced, and may also designate in the same manner as herein before directed, such other trees within the limits of the highway as in their judgment should be preserved for ornament or shade.

"SECTION 3. Whoever shall wantonly or intentionally injure or deface any tree thus designated or any of said nails, spikes or washers affixed to said trees, shall forfeit not less than five, or more than one hundred dollars, to be recovered by complaint, one-half of which fine shall go to the complainant, and one-half to the city or town wherein the offense was committed."

The act of March 29, 1893, establishing the present Forestry Commission, requires it to "hold meetings from time to time in different parts of the State for the discussion of forestry subjects." This branch of forestry work, though inaugurated by the second Forestry Commission, under the leadership of its able president, Hon. Joseph B. Walker, and its indefatigable secretary, Rev. J. B. Harrison, flagged for lack of audiences. During the past two years audiences have been easily found by the present Commission, through the enthusiastic co-operation of the Patrons of Husbandry and the State Board of Agriculture, which have placed this topic on the programmes for their regular meetings. The New Hampshire College of Agriculture and Mechanic Arts also has aided in the public discussion of this subject by including in its "Institute Course" for 1893-4 a short series of lectures on Forestry.

Such briefly has been the forestry legislation of New Hampshire. The vital interest of the State in this subject is evidenced by the fact that a larger acreage of its soil can profitably be devoted to the cultivation of trees than to the raising of wheat or any other cereal, by the probability that the completed returns for the census of 1890 will show that its lumber and saw-mill industry is second to none in the State, by the judgment of experts that from an economic view the present system of cutting pursued by the lumbermen is doing incalculable damage, and by the universal opinion that the deforesting of the White mountains must rob the commonwealth of its greatest natural beauty. It is apparent that the legislation described is inadequate for the proper protection of this vast interest upon which must depend so largely the future prosperity of this commonwealth.

PUBLIC MISAPPREHENSION OF THE FORESTRY QUESTION.

By J. B. Harrison, Franklin Falls, New Hampshire.

The careless and wasteful methods of treatment of our forest interests and resources, which have been common in this country, have always had close and vital relations to the general contents of the American mind—that is, to the whole body of ideas, theories, opinions, beliefs and assumptions which belong to the intellectual life of our people. They are features and products of our mental conditions and environment, and belong naturally to the stage of civilization and development which we have reached. We have used our other great natural resources in very much the same way. We have wantonly wasted, and, in many instances, completely destroyed valuable sources of supply for fish and game. The supply of water for the irrigation of vast tracts or arid land in the western part of our country has been, and still is, seriously threatened by the national indifference to injuries to the mountain sources of the rivers from which this means of wealth must be drawn.

Here in New England our principal mountain streams are being choked and polluted by sawdust and other sawmill refuse, and are being transformed into sewers. Their waters, if they had been kept pure, would be worth millions of dollars to the dwellers in the great towns between the mountains and the sea, and especially to the vast populations which are gathering in the shore lands of Massachusetts and other States. The great White Mountain springs should naturally supply millions of the people in the Atlantic coast cities with pure water for domestic purposes, but the streams from these sources are already indescribably foul and noisome, and their polluted waters carry disease and death to the unfortunate people who have to drink them.

Our mountain landscapes are needlessly defaced and vulgarized, and the attractiveness of our scenery is being steadily reduced, obliterated and destroyed, although this scenery is the source of an actual annual revenue of many millions of dollars for our people.

The general treatment of springs and of small or local sources of water supply, by individual proprietors, is nearly everywhere such as to destroy them entirely, even where they would have a definite and important money value. In New England thousands of such springs have been extirpated. There was formerly a spring at the head of nearly every ravine which leads down from the higher land to the inter-vales, or bottom lands, along the rivers; often a spring every few rods, sending down a never-failing stream of the purest water to help maintain the equable flow of the mightier current through the valley below.

These springs were usually situated where the ground could not possibly be cultivated, as it was too steep for any kind of tillage. If a small area around each spring had been left to the growth of timber the perpetual supply of this product would have been permanent. But the usual course of treatment is to cut off all the trees and bushes, and when the brush has become dry, to burn the ground over, so as to destroy all possibility of the reproduction of tree growth at that place.

In consequence, the slopes above and around the spring soon begin to break away, the surface soil slips down, and the sand or gravel of the hillside spills out and smothers the spring, often filling and burying the entire nook or glen in which the spring was situated. There are now hundreds of these small deserts along our river inter-vales, where once all was verdure, freshness and beauty. Some scientific men hold that all the deserts on our planet have been created by human agency. I do not know whether this is a correct opinion, but my fellow-citizens in New England are still engaged in the business of desert making.

Our treatment of the soil itself, the greatest of all our natural resources, has been to a very great extent wasteful, reckless and unintelligent. My neighbors burn their fields over every spring, wherever their is a sufficient film of grass, weeds or stubble to lead the fire over the ground. This burns out the fertility of a thin stratum of the surface, and this is ploughed under each year, and at the same time a new layer of the soil is turned up which will be subjected to the action of fire at the opening of the following season. The land thus treated grows whiter and sandier, as cultivation progresses. The owners buy increasing quantities of "commercial fertilizers," and complain of the diminishing fertility of their fields. Not long ago I saw almost the whole length of the valley of the Red River of the North ablaze with burning wheat stubble and straw.

Every year scores of people are burned to death in this country, and property of the value of many millions of dollars destroyed, by fires which might easily have been prevented. The causes of such fires belong to two classes—those of faulty construction of buildings, and those of inadequate care of stoves, furnaces and fire-places. It is *a little cheaper* to build houses and stores, so as to invite the resistless spread and dominance of any fire once started and so we build them in that way.

Very often a great fire would have been preventd by the employment of night watchmen. But that would cost three or four dollars a night, perhaps; so the owner or occupant hopes it will be all right, and takes the chances, and the building burns. Multitudes of our people think there is no actual loss when property in any amount is destroyed by fire, *if it is fully insured.*

The ideas, notions and practices of our countrymen in relation to our forest interests and resources are not exceptional or peculiar. They are of a piece with the general intellectual character and possessions of our people. "The spendthrift's childlike faith in the inexhaustibility of his patrimony" is a strong belief in the general American mind, and it is a potent influence in our national character and action.

A large proportion of the intellectual possessions of the American people consists of notions, ideas, theories, assumptions and beliefs which will not bear any searching analysis. This is not only true of the masses who work with their hands for wages, who have little time or opportunity for culture, but it is true also, to a great extent, of most of our "educated people" as well. Since our civil war no exigency has arisen to compel us to "take account of stock," or to examine and revise the mass of incoherent and undeveloped "views" and fancies, which have in various ways come to be taken for granted, and which now fill a great deal of room in the average American mind.

Chief of all these, and most important in its bearing on our methods of managing our national resources, is the fantastic trust in the omnipotent power of science to deliver us from all need of care, toil, economy and foresight, and to make good all the losses caused by wanton waste and stupid destructiveness. We destroy, instead of preserving, forest conditions on our mountains, because the mass and average of the American people believe that science is almost certain to provide adequate substitutes, not only for food and timber, whenever such substitutes are needed, but for everything else which we waste and destroy.

We look to science to bless our disregard of economic and moral laws with all the rewards of wise and orderly living. The natural effect upon character of such a belief is the breaking down of moral distinctions and the emancipation of the mind and will from obligation, and this effect is already widely manifest. The full consequences of this mighty transformation in thought and character will probably unfold themselves gradually. But the people who cherish this entirely unscientific trust in science are very numerous; they are our fellow-citizens; they have votes, and their dreamy faith in unrealities appears not only in our treatment of our forest interests and resources, but in national legislation and policy regarding other important departments of our national life.

Our forestry problem in this country, like most of our other serious problems, is largely a psychological problem. Any great and permanent gain in our methods of dealing with our natural resources must be based upon, and result from, a substantial improvement and advance in popular thought; and this can at the present time be brought about more readily than has ever before been possible. We need more effective agencies and methods than have yet been brought into operation for the education of the American mind. We should continue and extend the use of all the means which have been found efficient for the diffusion of knowledge and the propagation of ideas, and should employ some additional methods, adapted to more rapid and thorough operation.

Mr. Bryce, in his admirable book, "The American Commonwealth," remarks that "associations are created, extended and worked in the United States more quickly and effectively than in any other country," and he recognizes their value as "organs for focusing and propagating opinion." The American Forestry Association is exactly such an organization as Mr. Bryce had in mind. Such an association can take any substantial idea, which admits of brief and clear statement, and can put it into the minds of all the people of the country, so that they will think about it and talk about it. Of course, we must have money for printing and postage in order to undertake such educational work, and it is much to be regretted that some of the rich men of this country who have gone on founding miserable little colleges where there were already too many, should not have preferred the much more effective and valuable educational work which I have here indicated.

The American people are accessible and teachable in a very high degree. Never were there anywhere in any former time seventy millions of people so ready to be impressed and influenced by anybody who cares enough about any substantial idea to try to propagate it, and who, in his efforts for that object, will show respect for the natural laws and methods for the propagation of ideas. There is no special, inherent or insurmountable difficulty to hinder or obstruct the educational work which is so greatly needed in this country to promote rational methods of treatment of our forests and water sources. It would be a great benefit to our national interests in many ways if the American Forestry Association were enabled to undertake and prosecute this work of universal popular education regarding the whole subject of forest interests, resources and functions in this country.

There is a pressing requirement for some more specific and adequate plan and order of exercises for the observance of Arbor Day. When the day was to be celebrated for the first time here in the Eastern States, very few of the persons who kindly arranged the order of exercises knew much about forests and trees, except that they were the source of our lumber supply, and very few had any definite notion of the objects for which the day was instituted. As a result, we have a great deal of oratory and music and sentimental poetry on Arbor Day, but very little instruction; and, usually, no care is taken of the trees planted on that day, so that most of them are dead when the day comes around again.

The trees should be planted before hand, by some competent person, when it can be done carefully. A man can plant a tree properly with half a dozen school children watching him, and they may thus learn how to do the work themselves. But no man is likely to plant a tree rightly when two hundred people are looking on, impatient for the more sensational features of the Arbor Day programme. When we consider the careful, unhurried manner in which a tree should be planted, it is obvious that music and oratory are not much more suitable accompaniments than they would be for the work of milking a cow. In this State, and in some others in New England, Arbor Day has been used in several instances, both last year and this, by those who are opposed to the movement in behalf of the rational treatment of our mountain forests, as an opportunity to attack the very objects for which the day was instituted.

We need a kind of "Ritual" or "Liturgy" for our observance of Arbor Day—a responsive reading, in which the audience can take part with a leader. This, with a brief preliminary general statement, would enable us to make sure in all cases of having the primary and essential facts, ideas and objects with which the day is concerned, *plainly* set before the people in attendance, and especially before the children and teachers of our public schools. Everything should be plain, with no attempt at oratory or eloquence, no sentimental vagueness, no statistics: they put people to sleep.

IN PATHLESS WOOD.

By Edward L. Berthoud, Golden, Colorado.

For nearly two years in our early twenties we lived in the hot-house forests of New Grenada; the last year of our residence was in a shingle-roofed frame house built of Maine pine lumber, on a clay bluff over forty feet in height, rising from the water's edge of Chaques river. Except for the railway clearing, which gave a vista of about one-fourth mile each way, we were surrounded by a vegetable wall of deciduous and palm trees, linked by a tangled mass of liemas and prickly undergrowth. Terrestrial plant growth, and the gay parterres of varied flowers so common in the northern woods and groves, were almost totally wanting; and even in the few open savannahs the variety of genera was limited. To get a fair idea of the peculiar species of herbaceous growth one was compelled to look upwards, and his search was fructuous and ever-changing; plant growth, checked or eliminated by the dense opaque shade, became arboreal and parasitic, while the floral treasures of the enormous lofty trees were out of reach from the botanical collector. With all this exuberant growth was a legion of insect life, flying, creeping, buzzing and scavengering in every direction, enlivened with the harsh screams of parrots and parroquets and toucans, doves, tropicals and gallinaceae. The recesses of these giant woods teemed with life and growth, but rendered an excursion intolerable to the unacclimated.

We will not attempt to describe the almost untold variety of parasitic growth of orchids, heliconias, arums, cacti and ferns that each tree carried in profusion; nor to attempt to name their endless changes of form, perfume, foliage and color, which defy computation. It is enough for me to say that we were dazzled, as well as depressed, over the mixtures of plant life which seemed abnormal, yet so bizarre as to lose the seal of quiet beauty that the lovely flora of the northern woods of the United States, or of the secluded valleys and mountain tops of our Rockies exhibit everywhere. We seemed at the equator to be carried back to the forests of the carboniferous age, for along the river Chaques the multitudes of saurians, the huge snakes, the quiet tapir, timid in his solitude, the water teeming with fish, gave a good idea of the jungles of a former age, while around the clearings and savannahs the few scattered fruit trees were alive with monkeys reveling in liberty, the putative ancestors of coming races of men, the undeveloped fathers of future tribes of American aborigines.

Yet this magnificence of tree and plant growth was wanting in restful pleasure and minute beauty, conveying a sense of feeling that this was a war of destruction between animate and inanimate life, in which man and animate life were largely inferior, and the survival of the fittest not yet determined.

Turning from this digression on the aesthetic view of tropical vegetation, I will introduce my reader to a bit of woodland reminiscence, such as yet can be occasionally seen and enjoyed in a Rocky mountain forest, on some of the affluents of South Platte, such as the valleys of Clear or Bear creek, about latitude 39 degrees, 35 minutes north. In the words of Longfellow, here is "the forest primeval," at an altitude above the more temperate valleys of the foothills, yet more than 2000 feet below that varying factor, the line of tree growth.

The forest is composed of the several species of pine, spruce and Douglas Fir, with Aspen groves and a scanty growth of alders, birches and willows on the more marshy borders of rivulets, eked with an occasional clump of Vine Maple or Dogwood. The groves are generally composed of tall trees in the full vigor of growth, and in such close proximity we were constantly obliged to force ourselves between their trunks sideways. Subdued and restful was the impalpable music of the forest; no insect could be heard except an occasional deer fly, while overhead squirrels, wood-peckers, cerulean jays, Clark's crows, cross-bills and pine finches kept up a clatter of subdued music and rapid blows, varied with the notes of a large wood pigeòn or the booming, sad call of doves; by and by we are startled by the loud rush through the trees of a timid dusky grouse disturbed from its bearberry patch, while in an open glade we see the recently scratched up holes of some errant bear digging its favorite valerian roots, or the twisted and tangled top of an Aspen sapling, a mark of the playful work of an elk polishing his antlers; all bear the impress of insouciant first creation, before man, the egotistical last creation, brought death and fell destruction upon animate and inanimate nature.

But listen!—a loud crash is heard; we hasten to ascertain its origin; a venerable fir tree, an ancient of days, has reached the apogee of its existence— dry and withered, its bark wrinkled with age, a giant of the forest whose shattered head has faced the storm of numberless ages, now lies prone in its soft bed of leaves and humus. Overborne by the weight of self, and deeply decayed, its woody fibre deprived of cellular strength, it has returned to the earth, from whence it came.

But another surprise awaits us; this ancient fir has most unmistakably run the full course of local life; presumably we shall see around it a group of its descendants ambitious to overtop the forest, like their prone ancestor; to our surprise we find none; the Aspen, the pine, the Spruce, surround the site of the dead monarch, with maybe one or two struggling saplings of fir, which are silently and imperceptibly elbowed out of their paternal grave and seem to be considered by the more vigorous growth around as orphans unworthy to succeed their decaying grandsire; and we can here say that in the Rockies, as well as in the San Juan and Wahsatch mountains. Aspen groves die when a size of from 1½ to 2½ feet diameter is attained by them, and fall down, preparing a rich, fertile bed for a succeeding generation of pines and spruces, nature's rotation of tree crops. With trees, as with other created inanimate and animate beings, the cycle of life is limited; eternal life no more belongs to them than to anything else in creation; and when ,after growing for 50 or 100 or 500, or even 1000 years, a time arrives when their powers of assimilation become more and more difficult and weakened, their time is not far off, and from sheer exhaustion and weakness they totter and fall, their course has run.

This is no ideal picture I have drawn; when I lived on the banks of the Chaques river, or in the interior forests of the Jothums of Panama, daily and nightly the spontaneous fall of old forest trees was heard, and although they were covered with leaves and parasites, and seemed as vigorous as their neighbor, yet they crumbled to pieces, weakened and decayed almost to the bark.

Heretofore we have, in our Rocky Mountain forest, given to our readers what we might call the aerial romance of the forest, but we have not spoken of the voices of the forest in the night, when animal life has gone to rest. These are various and at times cadenced, the friction of two crossed limbs, the grating of two tree trunks inclined in different ways, the switching, distant moaning of the night breeze in the pine tops, the strident whistling of a current of air transverse to a rotten knob-hole, or wood-peckers boring in a decayed tree, all mingle, and elicit attention during the wakeful hours of camp life, and at times, lulled to a whisper, seem the voices of distant denizens of the forest glades, or conferences of the unseen spirits of the air, whispering over the appearance of strange visitors. Shakespeare, I think in "Tempest," alludes to the voices of the forest when he speaks of the fairy Ariel enclosed in a tree—"Thy groans did make wolves howl." Two hundred years ago or thereabouts, Cotton Mather said that the devil was the "landlord of the wilderness;" while the good, honest Hollanders in New York State believed in "spooks" roaming around the secluded dells and woods of the Hudson and Mohawk. For ourselves, we stoutly maintain, like Darwin's Fuegian, that there are no "devils" in the Rocky Mountains; in fact, the old landlord of the wilderness has thrown up his lease and departed for lower altitudes.

One more point which we have touched concerns the humble flora of our Rocky Mountain trends and ridges—a flora, though exiguous, yet attaining a brilliancy, a beauty of form, and in some species a deliciousness of perfume that excels the heliotrope, the mignonette, or New Orleans violet. As to color, what can be more gorgeous than Parry's Primrose, or the bright crimson of the Painted Cup, the delicate blue of the Mertensia or the azure of Larkspur, and the velvety brown and yellow of the

Erysimium, all stealing their brilliant hues from the rays of an intense sunlight?

Once I heard an unlettered miner, enthusiastic over the beauties of a snowy range nook, where Myosotis, Silene, Phlox, Gilia, Saxifraga, and Sedum Sibbaldia gemmed the rocks, none over an inch high,exclaim: "I'll be dog-goned if them ain't dandies!"—his most hyperbolical expression of their minute beauty. Creeping under the trees, or gemming the green moss, the Twin Flower (*Linnea borealis*), the Kinnikinnick, the several Pyrolas, Moneses with perfume perfectly indescribable, the Ladies' Slipper, the Dudecatheon, lovely Calypso borealis, the red Geum, with hosts of Gentians, Pediculares, Calthas and dwarf Kalmias, to be appreciated must be seen in their native habitat, a good setting for this miniature garden.

When, however, we reach in a Rocky mountain forest the limit of tree growth, a limit which varies over 1600 feet according to location of slope, in reference to the sun, and to prevailing winds, we find far above the present limits in numerous places the decayed remnants of former forests that extended higher than present rules, while whole groves of firs and Canada Balsams uprear their ancient moss-covered summits at the limit of tree growth, yet scarcely one sapling is found a straggler in the ancestral shade.

This, we confess, we cannot satisfactorily explain, unless we assume that a slow movement of elevation is still going on in the lofty ranges of our Nevada. Either this, or a slow lowering of yearly and winter temperature, which would accompany increased elevation, may account for this phenomenon.

This narrative in truth gives the impressions that twenty-five years ago could be all experienced in a two days' trip. Today, alas, the forest primeval is fast disappearing. The picture I have attempted to trace of the peculiar features then seen in these secluded nooks and valleys has undergone changes in many of them that are the fell destructive results of fire and the wasteful destruction of the itinerant sawmill—the meanest and least defensible, dishonest occupation that anyone can undertake—where, under color of settlement, valuable timber, the property of the nation, is taken for the sordid gain of one to the detriment of thousands, with its accompaniment of forest fires intentionally kindled to burn the refuse timber left after logging, in order to reach more timber to purloin from the public domain. Can our Representatives stand by and look on, and give no remedy for this public wrong, which, in its future influence on cultivation and water supply, is ruinous and disastrous?

One hour's work can destroy a valuable tree which takes a full half century to grow, and one forest fire destroys the vegetative power of a given area that a century cannot restore.

CO-OPERATIVE FORESTRY.

By George B. James, Boston, Massachusetts.

The true preservation of the forests lies in conserving their growth, utilizing mature and marketable products, and in a management which shall secure a proper rotation of valuable trees, and an annual income, permanent in character.

Individual ownership of woodlands is the bane of American forestry. In the old world the preservation of the forests is considered one of the first interests of society, and consequently one of the first duties of government. With us our republican form of government has not yet assumed that paternal character which would guard the forests, conserve the rain-fall, and modify the climate.

Rational forestry demands methods covering generations, far-reaching, comprehensive—beyond the limits of a single generation. The policy of the individual in dealing with tree growth requiring a century or two for maturity is apt to be narrow, wasteful and short-sighted. His selfish interests or necessities demand an immediate slaughter of all the forest growth under his control. Either his experience or his education determine that one crop from his forest area is all he seeks. He is then willing to abandon his land, or sell it for a mere song.

Co-operative ownership of forest areas secures permanency, methodical work, with results beneficial alike to the community, as well as to the individual.

An object-lesson in forestry is needed by present owners of woodlands. They need to see an exemplification of proper methods. They have much to learn in the wise management, proper cutting and maintenance of subsequent growths of their wooded areas. In the era of forest abundance it seemed unnecessary to the average lumberman to give any thought to future supplies. Approaching scarcity and advancing values render them willing listeners to the gospel of rational forestry. A few co-operative ownerships of forest areas, managed with intelligence, and inspired by public spirit, would work like leaven in lifting the whole industry from the slough of waste and improvidence to the higher plane of intelligence and remuneration. The present generation of lumbermen should be taught that there is a better way to utilize their forest areas than that which they have employed in the past.

Co-operative ownership and management of forest lands are well exemplified in the workings of several clubs in the Adirondack Mountains. Here pleasure and profit have combined in showing proper methods in utilizing forest products. The original investments in the stock of these clubs have been largely augmented by increasing values. Such operations have done much to attract the attention of the general public to the value of associated effort in the ownership of forest lands. Preservation of forests must come about largely by the absolute purchase of lands either by nation, State or associated capital. Public policy dictates the conservation of the forests; yet we have no national or State laws which enforce such a policy. Hence for the present we must depend upon co-operative work and ownership in this important matter. Public-spirited citizens are banded together in associated effort for the health, morals and progress of the community. Similar plans of co-operative work are necessary in setting examples of effective forestry practice. The public is fast coming to understand the importance of the forests in the nation's economy. The next step must be to unite patriotic citizens in the good work of their preservation.

Here and there a wealthy individual devotes time and money in the establishment of a park, preserve or forest reservation. The example is good, and stimulates further development on similar lines. More effective work may be accomplished through the voluntary contributions of one hundred or one thousand associates, whose aggregate subscriptions may be sufficient to buy one thousand or five thousand acres of available and accessible forest lands, to exhibit the teachings of intelligent forestry. It ought not to be difficult to secure the active co-operation of five thousand individuals out of a population of 70,000,000 people.

No class of property is more attractive at present cost, none more certain to advance in future value, than forest lands. American forest lands are now selling at prices far below European values, and yet the consumption of forest products in this country is many times greater than that abroad. We are already engaged in the rapid slaughter of the last half of our original forest areas. In the old world forest lands are selected by rich families as entailments. Future generations will profit by these wise investments.

The immense increase of wealth points to a higher range of values in real property, and consequently to diminished income. The attention of wealthy men should be called to the desirable nature of investments in well-selected woodlands in this country. Associated effort has developed our railroads, canals, mines, navigation and manufactures. Corporations are absorbing individual industries, thereby cheapening production, increasing the output and placing many important articles of daily use within the reach of men of moderate income. Fierce competition is reducing profits to the smallest percentage. There is need of other fields to conquer, and investors are looking about to seek investments which promise security and income. Would that the forest products of the country could be grown and handled and manufactured with the same capital, skill and method as prevails in the cultivation of cotton, wool, sugar, and their subsequent conversion into products for almost universal consumption!

No other industry has received so little attention at the hands of associated capital as the ownership and care of our forests, and yet none presents a better field to the investor. Its products are staple, necessary and salable; its growth under proper conditions continuous and remunerative. Ripe trees are beyond immediate competition, as their mature growth demands a hundred years or more. New uses for forest products are developing; the demand for wood pulp and paper alone consuming half of all the spruce cut in the country. Managed with skill and care, our forests would yield double the present harvest in a term of years. Intelligent ownership, backed with sufficient capital, would give our American forests such a money value as to present one of the most tempting investments within present reach of co-operative desire. Co-operation in forest ownership would make available men of the highest skill, education and experience, as managers, the most improved machinery and transportation facilities for marketing forest products. In all these ways co-operative effort would have the advantage over individual operations, hampered by insufficient means, inferior machinery, and uneducated managers.

The establishment of clubs, Alpine societies, forestry associations and co-operative ownerships of our most important mountain forests will prove healthful, remunerative and patriotic. Around such an organization would crystallize a mighty movement, which would eventually influence State and national legislation, guardianship and ownership. A healthful public sentiment needs to be created in forest matters. This sentiment must have a rallying point in practical work, associated ownership and visible results.

Our forestry associations should not confine their important work alone to the spoken word and the printed page. Too much dependence has been placed upon the sentimental side of this question. This is all important at the start, but soon loses its convincing power in the minds of practical men, without some display of actual results. Without some plan of co-operative ownership eloquent protests against present forest management are all in vain. The force of example is most potent. Our forestry associations must show the courage of their convictions in the ownership of even limited areas of woodlands.

Let us imagine the power and influence which the American Forestry Association could exert if, in addition to its present valuable work, it could formulate and secure the subscriptions of thousands of public-spirited investors in co-operative holdings of forest lands. Such an important work is worthy the careful consideration of the association. Let it systematically seek subscriptions from citizens of every State in the Union, and let an appeal be made to the leading citizens of our Republic to stamp the enterprise with their approval and their liberal contribution. Such a co-operative movement would have a mighty influence for good. It would enable the best minds in the country to inaugurate a forest policy, adapted to our soil and climate. It would eventually result in the establishment of a forestry school, broad, wise and patriotic. It would show to the country that the American Forestry Association could lead a movement illustrating the advantages of practical forestry, as well as the cultivation of the sentimental or aesthetic side of the forestry question.

THE RELATIONS OF INSECTS AND BIRDS TO PRESENT FOREST CONDITIONS.

By Prof. A. D. Hopkins, Morgantown, West Virginia.

Forests under natural conditions, or, in other words, those unaffected by the advent of civilization, appear to be under the control of certain laws of nature which govern the vegetable and animal species therein in such a manner that a harmonious balance is usually preserved. No species of the vegetable kingdom is allowed to suffer severely from the undue increase of its enemies in the animal kingdom. Few, if any, species of the animal kingdom become extinct on account of a failure of their food, or from the attack of their natural enemies. A continued battle of the species exists, but it is a war in which none are conquered and none are conquerors, each species battling for its existence makes possible the existence of some other species; thus a balance is preserved.

This may be the rule under natural conditions, and all may go well until the unnatural conditions following the advent of civilization brings about a change. Then nature's laws are broken, obscure species of insects and plants come to the front, and others which were formerly abundant disappear. In the confusion, certain enemies of plants are for a time exempt from the attack of their enemies, and are left free to commit desperate ravages upon some species of vegetation; others, from a lack of a sufficient supply of their natural food, change their habits, and infest plants of an entirely different character; thus they escape for a time their enemies, which had previously kept them within proper bounds; others are introduced from foreign countries. Their enemies having been left behind, they invade our forests unmolested, except by man, until some of their old enemies are introduced, or they acquire new ones here.

When the process of clearing the land commences, new conditions are presented to the forest insects which are most favorable to their increase. The girdled trees in clearings, the logs, stumps and tops, and the injuries to standing timber by fire, all contribute to their multiplication, some of them changing their habits from that of infesting diseased and dead timber, to that of attacking the living, and through their numbers they are enabled to kill trees on their own account.

Some ten years ago, when the West Virginia Central & Pittsburg Railroad was being built through a portion of the spruce forests in our State, the timber along the line commenced to die from the attack of insects, and the trouble continued to increase and spread during the next three years until thousands of acres of some of the finest timber in this State was killed. Only four years ago an invasion of the destructive Pine Bark Beetle, starting somewhere near the line between West Virginia and Virginia, in Rockingham or Hampshire counties, spread like a conflagration over these and adjoining States wherever the pine grew. The pine timber on hundreds of square miles was killed, causing a loss of property having a value of more than a million and a half dollars. Similar devastations have taken place in Maine, New York and New Brunswick, and in the forests of Germany and France. Most, if not all, of these destructive invasions were occasioned by unnatural conditions brought about through the influence of man.

With the existing conditions in our forests, as previously mentioned, the opportunity offered for the breeding and multiplication of forest tree insects being most favorable, we are confronted with the problem of preventing damage and loss from the ravages of the obnoxious kinds.

Never was there a better time to study the intimate relations of forest-tree insects to certain forest conditions. Neither can there be a better time to obtain knowledge of the characters and habits of forest-tree insects, with a view of utilizing this knowledge in the future system of forest management, which must necessarily follow this age of forest destruction.

With reference to the relation of birds to certain forest conditions, I realize that I will be trespassing upon a sacred and much lauded faith among our people, that birds are our greatest friends as insect destroyers, when I say, that from my own observations, I am ready to conclude that in the end they have very little, if any, beneficial influences in the prevention of insect depredations in our forests. That insectiverous birds obtain the larger share of their food from the insect world, and that they devour immense numbers of insects and other small forms of animal life, no one can doubt. They are not, however, our friends to the extent that they will devour those only which we look upon as injurious. In truth, they make no choice between those which are beneficial and those which are injurious. They capture alike the parasites of the injurious species, the parasite of the parasite, as well as the injurious species; hence it would appear that in the end no good is accomplished. They merely take the food nature has provided from the ranks of the insect armies of opposing forces, and neither one force or the other thereby gains an advantage.

One class of birds known as Woodpeckers, which, by the way, are recognized above all others as exercising the greatest benefit to mankind in the destruction of wood-infesting insects, are not so beneficial as we have been led to suppose. My attention was forcibly called to this fact during an investigation with reference to beneficial forest-tree insects in Germany in 1892, where I was seeking for an enemy to introduce against our destructive bark beetles. I determined that a certain species, a Clerid Beetle, was by far the greatest enemy of European bark beetles, and was successful in finding a forest in which they were common. I was surprised, however, to find that the Woodpeckers were the greatest enemy of the Clerid. The larvae, pupae and adults of this beneficial insect had occurred in great numbers in the bark of small pine trees that had been broken by snow the previous winter. They had destroyed most of the bark beetles which had infested these trees, and had gone into the outer bark near the base of the tree to make their cocoons in which to pass the winter. It was in those trees only which had escaped the attack of Woodpeckers that I succeeded in obtaining specimens. In some places not one infested tree in twenty had escaped the birds, and in those they had attacked, apparently not a Clerid in one hundred had escaped them. This observation led to subsequent investigation with reference to the habits of Woodpeckers, for the purpose of ascertaining their true relation to injurious insects and to trees. It has been determined that they do not peck holes in the bark of healthy growing trees (a common habit with some species) for the purpose of obtaining insects, but do so for the purpose of securing the inner bark and sap for food. I have seen trees that had died on account of the quantity of bark that had thus been removed from around the trunks. I have recently discovered that an injury to the outer sapwood, caused by them while thus engaged, results in a common and quite serious defect in the wood of different kinds of trees. I have also determined that what is known as Curly Poplar, a curled and wavy condition occurring in the wood of Tulip Trees, is the result of the punctures in the bark made by these birds.

FOREST FUNGI—ANTHRACNOSE OF POPLARS.

By Dr. B. D. Halsted, New Brunswick, N. J.

Forests do not escape the attacks of fungi, for nearly every tree has one or more of these parasites preying upon it. Among the most conspicuous of these fungous enemies are those that produce gall-like structures of the stems. Of such are the "apples," so-called, of the cedar trees, that are brown enlargements of the small branches, and become covered with large yellow, gellatinous horns in spring time.

Other conspicuous twig enlargements are the black knots upon the stems of the cherry. Both these and the galls upon the cedar have an economic importance beyond that of the forest, for the fungi producing them grow upon orchard trees. Thus the cedar galls give rise to the leaf rust of the apple, while the black knot is often very destructive to cultivated plum and cherry trees.

It is, however, to the leaf parasites that attention is more particularly called at this time, for of late some kinds of forest trees have suffered greatly. During the past few years the Sycamore or Planetree *(Platanus occidentalis)* has been almost defoliated by a species of anthracnose known to science as *Glœosporium nervisequum*, (Fl.) Sacc. This fungus has been studied by European and American mycologists, and its habits are fairly well known, and recorded in the books. An account of it may be found in the Journal of Mycology, Vol. V. So prevalent has this leaf-blight become that the Sycamore trees present an unsightly appearance, not only the foliage, but the young twigs becoming blighted by the fungus.

A similar anthracnose *(Glœosporium saccharinum,* E. A. E.) has increased upon the maples until they, especially the *Acer saccharinum*, show their foliage in a half dead condition early in the season.

In like manner the oaks have their foliage blighted. The white oak (*Quercus alba*) often has its leaves brown by the attacks of *(Glœosporium canadense,* E. A. E.), so much so, in fact, as to suggest the work of a fire, and, of course, is quite destructive.

It is seen that the three last-mentioned diseases of forest trees are all caused by members of the same genus, and they produce results upon the foliage and young twigs that are quite similar.

Special attention is now called to a blight of poplars that is due not to a Gloeosporium, but a fungus so closely related as to be in a neighboring genus: namely, *Marsonia populi*, (Liv.) Sacc.

The most evident thing in connection with this blight is the killing of the small lateral twigs, and the portion of the main stem where these twigs join it. When this dying of the growing layer of the main twig is extensive the tree is ruined. The dying of the bark in patches along the main stem was the first thing observed by the nurserymen, and at first sight it seemed likely that the destruction observed was due to Bacteria which made their entrance at these points; but a further study of the disease, and an examination of the plants in full leaf made it evident that the trouble begins in the foliage and then descends through the leaf stalk to the small side branches, and then on to the main stem.

This fungus, one of the anthracnoses, most likely makes its entrance through the openings (stomata) of the leaves, and spreads from there by means of minute filaments which occur through all parts of the leaf and other portions of the plant. A leaf that is badly anthracnosed shows minute specks over its entire surface, and does not give the appearance of many of the other sorts of leaf blights where the disease seems to start from a single point. The spores of the Marsonia are produced in great abundance in the little specks upon the leaf, and are poured out upon the surface, and then washed away by the rains, or carried, when dry, by the winds, so that there is ample opportunity provided for the spread of the anthracnose of the poplar.

It is evident that a plant which has the twigs so diseased as to be almost lifeless is of no commercial value. It is possible that, by cutting the affected side branches, the main stem will recover fom the injury it has received, and thereby a good plant may finally be produced; but as in many other cases of this kind, when a plant is diseased, it is quite apt to have the threads of the fungus so thoroughly scattered through its tissues that there is great probability of its remaining a blighted or anthracnosed plant throughout its life.

This *Marsonia* is common in Europe upon several species of the genus *Populus*. It also grows in this country upon a number of our poplars, both wild and cultivated. The wild poplar (*Populus alba*) is particularly subject to this parasite.

The presence of the *Marsonia populi* in the dying twigs of the nursery poplar trees was demonstrated microscopically, July 14, 1894, and there remains little doubt, if any, that the destruction among the nursery poplars is this anthracnose.

THE PREVENTION OF FOREST FIRES.

By GEN. C. C. ANDREWS, St. Paul, Minnesota.

A Report on Forestry, by Dr. Hough, published by the United States Government in 1877, devotes several pages to the fearful ravages of forest fires in several of the States. Official reports by the Chief of Division of Forestry, Department of Agriculture, pulished in 1887, 1888 and 1890, also devote attention to the same subject, and show that the loss from forest fires in the United States amounts to the enormous sum of $25,000,000 a year, a sixth part of which is occasioned by fires started by railroad locomotives. The subject will be found frequently treated of in other official documents and in the columns of the various forestry periodicals.

Attention has been freshly drawn to the subject by the dreadful forest fire which raged in July, 1894, in Northern Wisconsin, devastating especially the county of Price, wiping out the town of Phillips, its county seat, and causing most pitiable distress to a great number of people and the loss of many lives. It is difficult to imagine the horror of such a catastrophe. It is difficult to imagine the dismal appearance of the blackened ruins, the chaos of obstruction such a fire leaves for a generation or two, or the apprehension, terror and suffering of inhabitants whose lives it endangered.

This recent calamity calls to mind the awful forest fire which raged in Northern Wisconsin and Michigan during the first half of October, 1871, and which destroyed not only many million dollars' worth of timber and other property, but the lives of 800 people. The *London Daily News*, in an editorial at the time in regard to it, used the expression "That terrible phenomenon of the Western World, the forest fire!" Well, indeed, might any enlightened writer exclaim, "That terrible phenomenon of the Western World, the forest fire!" These fires occur with greater or less intensity every year, and are treated as a sort of nine-days' wonder—deeply lamented and quickly forgotten. For the American people thus to allow such calamities to habitually occur, without adopting any adequate means for their prevention, causes our country to be regarded as in some respects only semi-civilized.

Of course, forest fires sometimes occur in countries which maintain systematic care of forests, but not so frequently nor to the extent that they do in this country. In such countries as Germany, France, Austria and Sweden the public forests are administered so as to yield a steady net revenue of about 4 per cent., without any diminution or deterioration of the forest but rather an increase of its resources. Their principal means of preventing destructive fires are the constant *watching and patroling* of the forests by guards, or foresters, who reside in their respective divisions. I have pleasant recollections of observing the clean and thrifty appearance of forests in each of the countries mentioned. An outline of the prevailing system of management is about as follows: The public forests are divided into districts, sub-districts *(Reviere)* and divisions. A district may embrace a large geographical area—a province or part of a province—and is in charge of a forest inspector. A sub-district, which includes several divisions, is in charge of a director, and a division, usually comprising 1200 to 2500 acres, is in charge of a forester, who resides in his division in a dwelling belonging to the government, and who personally, or through an assistant, keeps watch of everything in his division pertaining to the forest. He also attends to its economical details, to the building of roads, to the protection of valuable game and the destruction of noxious animals. He has received a forestry education; he is a government official, of humble rank, it is true, but his position is partly scientific; it is permanent, and he is proud of it, and looks forward, through efficiency and fidelity, to being ultimately promoted. His division is provided with good roads. Underbrush is not allowed to accumulate; in some places belts of deciduous trees are grown, or openings left to prevent the spread of fire. Trespassers of all sorts are excluded. It is personal presence, watching and patroling, and the enforcement of reasonable regulations, that prevent fires. But should a forest fire occur, he is already instructed how to proceed for its extinguishment. There are good means of communication, and he can promptly summon assistance. It is made the duty of all neighboring inhabitants to lend their help. Women and children with wet brooms are sometimes his effective assistants in beating out a fire. If a fire has gained considerable headway, he can pretty quickly have a belt of timber felled in its path; or, he can meet it by an opposing fire. In those countries which carefully administer their forests there appears to be a moral sentiment against any act or neglect that would cause a forest fire.

The laws of our separate States are not wanting in penalties against setting forest fires, but they are ineffective. We shall never prevent these terrible calamities until public forests in our country are systematically cared for as they are in the countries above named. The pecuniary gain, to say nothing of enhanced national reputation, that would be derived from preventing great forest fires, would pay the cost of management twenty times over. If we are not above going to a new country like Australia to borrow an election law, why should we so long refrain from borrowing of the old, enlightened countries of Europe a few well-tried regulations for the care of forests?

Granted that much of the timber land which is being devastated by fires is private property, and cannot be subjected to government management, that, however, should not hinder the government from adopting measures for the prevention of fires in its own forests. Should the government succeed in such measures, its example would be followed by private owners. If the government would adopt reasonable measures for preventing fires in its own forests, it could more effectively insist that railroad companies should employ guards to extinguish fires set by locomotives, or that appliances should be used to prevent their setting fires.

Shakespeare says:

> "Wise men ne'er wail their present woes,
> But presently prevent the ways to wail."

Forestry friends have been wailing forest woes for many years. As one step for preventing "the ways to wail," I would suggest that this Association adopt a short memorial to Congress substantially like the following:

"To the Congress of the United States:

"Your memorialists, the American Forestry Association, respectfully represent that forest fires annually cause great damage to the timber lands of the United States, and are frequently attended with a great deal of suffering and loss of life; that such fires could be very largely

prevented by the adoption of forest management such as has proved successful in Germany and several other European countries; and we would respectfully ask that suitable legislation for this object may be enacted."

I would also suggest that a committee be appointed by the Association to request the President to consider this subject in his next annual message.

ECONOMIES IN RAILWAY TIES.

By E. E. Russell Tratman, A. M., Amer. Soc. C. E.
New York.

At the meeting of this association at Philadelphia, in 1889, I had the pleasure of presenting a paper on "Economy in the Consumption of Timber for Railway Purposes," referring to the necessity for such economy and the ways in which it might be effected. In the present paper I propose to deal briefly with economies in the use of railway ties, which are an important item in the total consumption of timber for railway purposes. In the first place, let us take a few statistics to whet our appetite for more practical information. In 1892, the amount of forest areas in the United States was about 500,000,000 acres; on an average, 100 ties are obtained per acre of forest, so that 26½ acres must be cleared to supply ties for one mile of new track at 2640 ties per mile. To this we may add 31½ acres for ties for renewals. To insure a permanent supply at this rate of consumption, it is estimated that there should be maintained 113 acres of growing timber to each mile of track. The total length of railways is nearly 180,000 miles, or 230,000 miles, including double and side-tracks. With an average of 2500 ties per mile, this represents a total of 575,000,000 ties in service. The annual consumption of ties for construction and renewals is between 75,000,000 and 90,000,000; while the annual consumption of ties and sawed timber for bridges and trestles represents about 500,000,000 cubic feet of round timber. This is exclusive of timber for telegraph poles, stations and buildings, fences, cars, etc.

While the aggregate consumption of timber amounts to a serious figure, as can easily be shown by such simple estimates as above given for ties, it is hardly necessary to point out to members of the American Forestry Association that this consumption represents but a part of the total annual removal of standing timber and reduction of the timber resources, owing to the reckless and wasteful methods of cutting, the illegal cutting of timber on government and private lands, and the destruction by forest fires. In view of these facts and figures, and in view of foreign experiences in forestry work, I am impelled to strongly urge the prompt adoption and firm enforcement of a forestry policy by the government, placing the whole control and repletion of the forests in the hands of competent men, who will see that the timber resources are managed in the interests of the legitimate consumers of the present and future.

Now let us turn our attention to the specific question of railway ties. Economy in their use may be effected in several ways: 1. By care in the selection and use of new ties; 2. By care in renewals (so as to insure that each tie is allowed to give its full life); 3. By treating the tie by preservative processes, so as to enable the wood to resist decay; 4. By protecting the wood from the cutting and abrading action of the rail by tie-plates; 5. By the substitution of other material for wood. These we will take up in the order given, merely glancing, however, at their salient points, since a thorough discussion of each would form a paper too long and too technical for this occasion, my intention being principally to call attention to the practical economies which benefit all concerned, but which are not sufficiently well realized.

1. *Selection and Use of Ties.*—On some railways, and in certain sections of the country, the ties supplied from neighboring sources are found to be deteriorating in quality, owing to the fact that the best timber has already been cut. All sorts of wood are used for ties, and the advisability of using the former kinds and qualities depends upon the local prices and the conditions of traffic. Ties are too often considered, even by railway officers, as a comparatively unimportant item in the expense account of maintenance, but in fact the average cost of the re-

newals on many roads already exceeds that of the rail renewals, and is still increasing. The increase is due to several reasons: A, gradual increase in price, due to exhaustion of local sources of supply; B, the marketing of the best timber, so that the poorer qualities are cut for ties; C, insufficiently rigid inspection and acceptance of inferior ties; D, greater local rot and cutting under the rails, due to increased wheel loads and traffic; E, "spike killing," caused by re-driving loose spikes. The last two causes are especially noted on curves. It has been a very common impression that young timber was more durable than old ,and less liable to decay, but really young timber—that is, before the heartwood is well developed—is less durable than older heartwood timber. Sound, mature, well-grown trees yield more durable timber than either very young or very old trees. In hardwood, rapid growth timber is the better; while in coniferous wood, slow growth is the better. The ties should be cut at the most suitable time of the year, and allowed to season for some months. The objections to sawed ties, as compared with hewed ties, are believed to be largely a matter of local experience, and not to be of general application. The specifications for ties should be carefully and intelligently drawn up, and the inspectors instructed to see that the ties conform closely to the requirements. At the same time it should be borne in mind that if good ties are wanted, a good price should be paid for them; and it is false economy to buy a lot of ties because they are offered cheap. The cost of putting in and taking out is the same, and with the cheaper ties this cost is incurred more frequently, besides which the increased frequency of renewals is detrimental to the maintenance of good track. Ties accepted but not needed at once, should be stacked or piled, the bottom row resting on poles or blockings, as, if laid direct upon the ground, several of the lower rows will be affected by fungus growths. The common practice of pulling a tie into place by striking a pick into it should not be permitted, as it opens a place for rot to start. In re-spiking ties in the track, the old holes should be filled with wooden plugs, sand, tar or rosin. Ties will wear out more quickly on curves, and decay more quickly in poor ballast which does not drain well. It will be seen by these notes that there is room for the exercise of care in the selection and use of ties.

2. *Renewals of Ties.*—The renewal of ties forms a larger item in the maintenance expenses than is generally supposed, not only on account of the direct work of renewing and replacing, but also the attendant work on the track, and, as noted before, the cost shows a tendency to increase. If the higher officers are parsimonious and habitually cut down requisitions for ties, the track foremen will leave many doubtful ties in the track; on the other hand, if requisitions are filled without question, there will be a tendency to remove ties that have not served out their full life. In many cases a marked economy has been effected by checking the too common practice of taking out ties prematurely. The foreman should make a count (not a gross estimate) of the number of ties to be renewed on each mile of his section, and should mark such ties, but he should not be permitted to take them out until the road-master or engineer has made an inspection. Records should be kept of the annual renewals, and if any one year a specially large requisition is made, the reason should be called for. It is a good plan to notch or mark the tie to indicate the year when laid, and then in renewals it can be seen how the ties average as to life.

3. *Preservative Treatment.*—Ties are renewed mainly for two defects: A, natural and general decay; B, wear, abrasion, and consequent local rot under the rails. The principal object of the preservative process is to arrest decay, but some processes also harden the timber, thus aiding to prevent failure of the second kind. The principal of most of the processes is to extract the sap from the tie by a vacuum, and then to force into the wood a fluid (such as creosote, chloride of zinc, etc.), which will fill the cells and prevent fermentation and decay. In the vulcanizing process, however, it is claimed that the sap itself is changed to a preservative compound already within the wood. For all impregnating processes the timber should be thoroughly seasoned before treatment, and it is waste of time and money to hastily treat unseasoned timber required for immediate use, though this is sometimes done where preservatives have been adopted, but where bad management or delay in authorizing requisitions have prevented the contracts for ties being placed at the proper time. Some four or five large Western roads are using treated ties extensively. On the Southern Pacific Railway, which has tie-preserving works of its

own, the number of renewals per mile decreased from 243 in 1891 to 240 in 1892, and 205 in 1893, while the requisitions for 1894 amounted only to 145 ties per mile. Of 4000 creosoted Virginia pine ties laid on the Central Railway of New Jersey in 1876, there were 1000 still in service and in good condition in 1894. One of the great advantages of the preservative process is that they enable timber otherwise useless to be made available, a treated tie of cheap wood being in some cases cheaper and of longer life than an untreated tie of better wood. Considering the economies to be derived in economy and efficiency from the use of such processes, it appears somewhat strange that progress in their introduction has been and still is comparatively slow.

4. *Protection by Metal Tie Plates.*—The cutting of the tie under the rails decreases the hold of the spike and shortens the life of the tie, especially on curves. Direct pressure of the rail on the tie would have no effect beyond a slight compression of the wood, but the cutting is due to the slight motion of the rail in its wave action and deflection under loads. This motion abrades and tears the fibres (causing opening of moisture), thus hastening local rot, and on heavy grades this is aggravated by the use of sand on the engines, which is ground between rail and tie. One of the most important and practical of modern implements in railway track has been effected by the introduction of metal tie-plates between the rail and tie, and as it involves only a small first cost, while its effects in economy in ties and track cost is apparent, it has been adopted on several hundred miles of track. These plates not only increase the life of soft (and cheap) though durable ties, but also effect a direct economy in renewals and maintenance of way. At the same time they add to the permanence and security of the track by giving a durable and uniform bearing to the rails, and lessening the disturbance of the track for renewals. On curves they are a great safeguard, as they prevent the tilting of the rails and the cutting of the tie by the outside flange. Without the plates much extra work of maintenance is required on curves to keep the track to gauge. With heavy traffic on a line with many sharp curves, the use of tie-plates has been found to effect an economy in maintenance expenses of 50 per cent. in ties and 75 per cent. in labor. Thin, flat plates will bend and

get loose, and make a disagreeable clattering noise under trains, and the plates must not be too large, or they will make a rough-riding track by interfering with the wave motion of the rails, causing the ties to rock in the ballast. The plates should be firmly fixed to the tie to prevent rattling, and this may be effected by fastenings more secure than the ordinary spike, or by ridges and flanges on the bottom of the plate which will bite into the wood. The former plan is most used with the heavy plates adopted in foreign practice, while the latter is most used here with lighter plates. These lighter plates are sufficient in themselves, but it is much to be desired that improved fastenings should be used with them.

Economy in the use of ties in the ways noted above results in economy in other directions: First, by increasing the life of the tie, it reduces the number to be purchased for maintenance; second, it may enable cheaper and inferior woods to be made practically equal to the ordinarily more expensive and better timber; third, it reduces the maintenance work on the track, not only by reducing the number of ties to be renewed, but also by lessening the disturbance of the track which such renewals involve; fourth, the more permanent condition and surface of the track are conducive to greater hauling capacity of the engines and better riding of the cars. In France, for instance, the annual consumption of ties for maintenance was reduced steadily from 170 ties per mile of single track in 1883, to 84 per mile in 1888, this being due to increased care in selection, improved methods of renewals, the use of the creosoting process, and the introduction of better fastenings, better ballast and heavier rails.

STREET PLANTING AND SHADE TREES.

By Henry C. Bliss, Springfield, Mass.

We have driven out our trees and the peaceful rest of their shade. Let us bring them back, for it is easy with modern means to get to them. If people knew how easy it is to plant trees, and if they realized how valuable these shade trees come to be for perhaps a century, more persons might be induced to join in the work. Nearly one hundred years ago someone planted a double row of elms on a street that bears the name of the tree in my own town. I cannot imagine how a man with greater ease and certainty could have added so much to the sum of human happiness. The grand elms on Court square, in this city, could have been planted in a day, but the loss of these old trees would put the city in mourning for a year. In one day I have gone into the swamps, with but two men to help, and taken up seventy-five elms. In two more days these trees could be planted with the same assistance. Of course, you must first find the swamp, but this usually requires but a little prospecting.

At first care should be taken to determine the line for the trees, and to that end boundaries must be carefully looked up. Casual paths must be ignored. The trees will be likely to fix things for many years, and new paths are easily made. In the village of Mittineague, in order to have the trees at a uniform distance from the margin of the road, it was necessary to put some directly in the common footpath. The people, however, kindly cared for the trees, and scarcely any suffered on account of their location.

In taking trees from wet ground, you will usually need but an axe, for trees in swampy or wet ground have no tap root, and the fibrous roots are usually bunched near the trunk. Cut the turf, or ground, about a foot out from the tree all around. In nine cases out of ten, the tree can then be pulled over, and with a few more blows of the axe you can separate it entirely from the ground. You will then have your tree with a bunch of root fibres and wet earth about as large as a half bushel basket. Now go to the other end of the tree, and no matter how cruel it seems, cut off its head, say 10 or 12 feet from the roots. Never mind if people say it looks a bean pole, in two or three years its head will come out all right. The roots having been cut off, it should not be left with branches; besides this, with branches the tree is wracked by the wind, and the new root fibres are liable to be torn off.

If the soil is sandy or of gravel where it is to be put, dig a hole for the tree as large as a half-barrel or half-hogshead, and bring enough rich earth from the gutter or the meadows to nearly fill the hole, then put some of the better earth at the bottom, and jaunce the tree up and down until it has fitted itself to a place; spread out the small fibres or roots and pack the earth closely around them; be careful and not jam off the tender roots with your boot or with sticks. Fill the earth in slowly, and carefully stamp or tamp it down to the top. Do not let the roots get too dry, and be careful not to pour on too much water. The native earth should not be washed off from the root; it is a god plan simply to sprinkle the root with water, instead of pouring it on from a pail.

With these precautions your trees will be pretty apt to live. Turn the turf upside down around the trunk, for mulching. The trees at the north end bridge of the city I brought in from the western part of West Springfield, in 1881, and they are planted in sand or gravel filling, but each tree had its own small load of earth at its roots, taken from the adjoining meadow.

The effect of locality is well illustrated with this year's planting. The trees on the north side of this street were taken from the same place, and planted at the same time, with the same care; but the trees with the southern exposure have outstripped them in growth. The North End bridge elms were part of 105 that we put out the first year. In my diary of 1882, when I brought in 150, I noted that all but five of the previous planting were alive. Several, however, afterwards died, and this leads me to say that furnace cinders should not be dumped at the foot of shade trees. Some of the West street elms were killed that way; and the large elm near the Canoe Clubhouse is dying from the same cause. The elms on Tubbs Hill, in Springfield, some 75 in number, are also planted in sand and gravel filling; but each tree was supplied with good earth at the root, and nearly every one lived. I think I put nearly every one of these into the ground with my own hands. I mention this only to show that ten minutes' care at the right time may save the tree, and may stand for a hundred years of shade.

One word as to the place of planting: Do not neglect the streets with poor houses; if they remain poor, they will need the shade all the more. I do not know of a more depressing sight than a poor, sun-scorched tenement in a large town; a cabin in the shade of the forest may, in comparison, be a palace, and to a great many more attractive. It is the surroundings and conditions that make the distinction.

Springfield is fortunate in her shade trees, and the grandest of all her elms. Mr. Phillipe, in his excellent article, quotes Colonel Foot as authority for the statement that nowhere in Europe do elms flourish and attain such large size as in Springfield. They are here for your inspection, and the place where the tree falls; there it does not prevaricate.

In my own town there was formerly the elm of which Oliver Wendell Holmes speaks in his "Autocrat." This tree measures 27 feet around its trunk at the smallest part. On Elm street, in this city, you can see today an elm that one foot from the ground measures 33 feet around; higher up it comes to be 20 feet, and next to the branches is 32 feet around. There is a large elm on the grounds of D. B. Wesson which it is said measures 26 feet, 5 feet from the ground. There is another magnificent elm on South Main street; in fact, you will encounter there magnificent trees in all directions. It is said that the elms on the main street corners of Court square were good-sized trees at the time of the Revolution.

The Druids never loved the oaks better than the dwellers of this valley have loved their elms. They bordered the meadows when the first settler came, they stood by his rude fort, and they stand today by his factory. Strong, self-poised, defiant of storm and responsive to sunshine, they represent the people they have sheltered. On some of these massive trees now living hung the sign of King George. From flint-lock to gatling gun, from stage coach to electric cars, they have been the silent bystanders and spectators or human progress.

Another shade tree, which attains in our soil an enormous size, is the Buttonwood, of the Plane tree family. Mr. Emerson speaks of a tree in Rhode Island which in 1839, one foot from the ground, measured 24 feet around. The second in size, according to the same authority, stood in a highway in West Springfield, and measured 16 feet, 6 inches from the ground. These massive trees spring out at odd places along our roads and streams. I used to suppose that they were common country trees, without pedigree or family history, that had fallen into the procession of trees and vegetation, which Holmes says eventually take up their line of march toward the city, to see what people have been doing in their old haunts. I have found, however, that this tree with a common name has a history to be proud of. Cimon planted them in Athens. Pliny admired them, and says they were brought across the Ionian sea to shade the tomb of Diomedes. No tree was so great a favorite with the Romans; they planted them in their public ways, and nourished them with wine. It is said that Hortensius arranged to give Cicero a continuance in court in order that he might go and water with wine his trees at Tuscalanum. This tree seems to belong in a warmer climate, or else has not got thoroughly acclimated, for it often gets nipped with the frost, and further set back in its usual tardy leaving out.

I have wondered how it happened that locust trees came to have been planted as shade trees in so many dooryards, apparently some 30 or 40 years ago. I find, however, in reading Emerson's work on the trees in Massachusetts, that these trees had been recommended as having many uses and as being valuable and ornamental. I presume people took this advice and planted them. They have, to a considerable extent, spread out in localities, but the beauty and value have, I think, not been realized.

Then comes the maple. For general purposes, including shade, perhaps it rivals all, and none would be missed from Massachusetts more. It attains to large size in this locality, and it is said, on our hills takes the place of the oak. With the autumn foliage upon them these trees are beautiful beyond description. We have in Massachusetts five species, the Red, the White, the Rock, the Striped and the Mountain. There is another tree deserving more attention as a shade tree than it has received, and that is the beech. This tree casts a dense shade, is clean, has few enemies, and it is said is never struck by lightning. They grow abundantly on our mountains, and can easily be planted in our parks. The horse-chestnut has also come to be notably a shade tree, and one of the finest specimens in the State is to be found near the courthouse. When it flowers in the spring, it reminds you of a grand public Christmas tree. The willow family is still represented among our shade trees to some extent, in its own proper species and in the common poplar.

I have confined myself to these few statements as to shade trees. A full list of our trees is published in the report of the City Park Commisisoners. I wish someone would publish a hand-book with plates for the easy identification of trees. Many of them are readily distinguished; as, for instance, anyone who can count can distinguish the white pine, with its bunch of five needles; the pitch pine, with its bunch of three, and the red pine, with its bunch of two.

LEGISLATION FAVORING THE PLANTING AND PROTECTION OF ROADSIDE TREES IN MASSACHUSETTS.

By Wm. S. Shurtleff, Longmeadow, Mass.

For many years there have been on our statute book provisions for supplying the waste by decay, design and accident, in our ornamental and shade trees. And lately many aesthetic and prudent persons have so forcibly and persistently presented the importance of preseving our roadside forest—friends to the wise men who go annually to the East, where the gilded dome directs the sun to the proper rising point—that statutes have been enacted and laws made, with penalties appended, for staying and punishing this senseless slaughter and for replacing the victims of our past prodigality and fool economy. It only remains with those who approve of this legislation to join with its authors in enforcing these provisions.

It is permissible, and perhaps necessary, to state these laws as they now stand on our statute book.

Chapter 54 of the Public Statutes provides:

Section 6. **Planting.** "The Mayor and Aldermen, Selectmen, Road Commissioners, or any municipal officer of a city or town to whom the care of the streets or roads may be entrusted, may authorize the planting of shade trees therein wherever it will not interfere with the public travel or with private rights; and shade trees standing and trees planted pursuant to such license shall be deemed and taken to be the private property of the persons so planting them, or upon whose premises they stand, or are planted."

Section 7. **Penalty.** "Whoever wantonly injures, defaces, tears or destroys an ornamental or shade tree, shrub, statue fountain, vase, or other plant or fixture of ornament or utility on a street, road, square, court, park, public garden, or other enclosure, shall forfeit not less than five, nor more than one hundred dollars, to be recovered by complaint, one-half to the complainant, and the other half to the use of the person on whose property or within whose premises the trespass was committed."

Section 9. "In a city in which the City Council, and in a town in which the inhabitants accept this section, or have accepted the corresponding provisions of earlier statutes, the Mayor and Aldermen or Selectmen may set out and maintain shade trees upon the public squares and highways at the expense of such city or town, which may appropriate annually for that purpose a sum not exceeding twenty-five cents for each of its rateable polls in the year next preceding that in which such appropriation is made."

Section 10. **Trees not to be cut down, etc.** "No person shall cut down or remove an ornamental or shade tree standing in a highway, town way, or street, without first giving notice of his intention to one of the Selectmen or Road Commissioners, or to the Mayor:—And if the Selectmen or Road Commissioners, or Mayor and Aldermen desire to retain the tree, they shall give notice of such desire to such person within ten days thereafter; and the damage caused by retaining said tree shall be determined in the same manner as in the case of damage by an alteration in such highway, town way, or street."

Section II. "If a person cuts down, removes or injures such tree, in violation of the provisions of the preceding section, or of the rights of a city or town acquired thereunder, he shall suffer the penalty provided in section seven, and the same shall accrue to the city or town."

Resolve of Chapter 32 of 1886:

Arbor Day. "*Resolved,* That His Excellency, the Governor, is requested to set apart in each year the last Saturday in April as Arbor day, and to issue his proclamation recommending that it be observed by the .... people of the Commonwealth in the planting of trees, shrubs and vines, in the promotion of forest growth, and culture in the adornment of public and private grounds, places and ways, and in such other efforts and undertakings as shall be in harmony with the general character of a day so established."

And this is now in effect and working good. So it appears that the framers of our public laws recognized that the aesthetic as well as the useful and protective and profitable had claim to their attention, for it is to be observed, and it is meaningful, that they included ornamental with shade trees; and therefore it has been admitted that the preservation of the beautiful is of public interest and benefit, and by affixing a penalty, it is declared, and by subsequent action in the courts, it is determined that the destruction of the beautiful, in this regard at least, is a crime, for penalties only follow offenses. Damages may be recovered by suit for trespasses and private torts, but penalties are only imposed upon public offense.

But the law-makers have gone further. Urged by many persons who deplored the rapid thinning out, by decay or design, or through corelessness, of our wayside trees, the Legislature of 1890, provided as follows:

Section I.
1890, Chap. 196. and Chap. 49 of 1891.

"The Mayor and Aldermen of the cities and the Selectmen of the towns within the Commonwealth, are hereby authorized to designate and preserve, as hereinafter provided in this act, trees within the limits of the highways for the purpose of ornament and shade (observe the aesthetic *ornament*), and to so designate not less than one such tree in every 33 feet where such trees are growing and are of a diameter of one inch or more."

Chap. 196. Sec. 2.
Marking Trees.

"Said Mayor and Aldermen and Selectmen shall, between the first day of September and the 31st day of December in each year, designate such trees as are selected by them for the purposes set forth in this act, by driving into the same, at a point not less than four nor more than six feet from the ground and on the side toward the center of the highway, a nail or spike with a head with the letter M plainly impressed upon it. Such nails and spikes to be procured and furnished by the Secretary of the Commonwealth (now by amendment, 1891, Chap. 49, 'the Secretary of the Board of Agriculture') to said Mayor and Aldermen and Selectmen as required by them for the purposes of this act."

Renew Mark.

"Said Mayor and Aldermen and Selectmen, between the first day of September and the 31st day of December of each succeeding year, shall renew such of said nails and spikes as shall have been destroyed or defaced, and shall also designate in the same manner as hereinbefore stated such other trees as in their judgment should be so designated to carry out the requirements of this act."

Chap. 196, Sec. 3.

"Whoever wantonly injures, defaces or destroys any tree thus designated, or any of such nails or spikes affixed to such trees, shall forfeit not less than five dollars, nor more than one hundred dollars, to be recovered by complaint, one-half to the complainant, one-half to the use of the town wherein the offense was committed."

Chap. 196. Sec. 4.

"This act shall not apply to ornamental or shade trees whose preservation is now provided for by Chap. 54 of Public Statutes and acts amendatory thereof."

And to provide for carrying out this act, in 1891 the Legislature passed Resolve, Chap. 72, as follows:

Appropriation.

"*Resolved,* That there be allowed and paid out of the Commonwealth a sum not exceeding one hundred dollars, for the purpose of furnishing nails or spikes, as provided for in Chap. 49 of Acts of 1891, entitled 'An Act Relating to Preserving Ornamental and Shade Trees on the Highways.' Said nails or spikes to be procured and furnished by the Secretary of the State Board of Agriculture."

In 1892, by Chapter 147, it was provided:

Enlarging time for marking.

"The officials charged with the duty of marking ornamental and shade trees for their preservation within the limits of highways, under the provisions of Chapter 196 of the Acts of 1890, may make and renew such marks at such seasons of the year as they deem proper."

In order to protect the roadside trees, Chapter 403 of Acts of 1893 was passed. It is as follows:

"Whoever affixes to any tree in a highway, public way or square, a play-bill, poster, notice, advertisement, or printed paper of any description, or cuts, paints, or marks on such tree, without first obtaining a written permit from the officer having the charge of such trees in a city or from the Selectmen in a town, shall be punished by fine not exceeding fifty dollars and not less than five dollars for each offence."

Now, there is probably no one present who cannot aid in the carrying out the purposes of these acts to a complete accomplishment of their beneficence. It is probable that each person here can influence the officers in the government of his city or town or village, to diligence in enforcing these laws, and alacrity in availing themselves of their provisions. Every one of us can arouse enthusiasm and energy that shall beget action in some other one or more of our fellow-townsmen, and through them our whole community.

Let us each consider him or herself a committee of one to "see to" this matter. Let us persist and insist by entreaties, by argument, with prayers, if necessary, and *swears*, if unaccomplishable otherwise, and labor with, and belabor if need be, all our Mayors, our Aldermen, our Selectmen, our Road Commissioners, our neighbors—everybody who can help to take hold of this matter and see to it.

The air is burdened by unsyllabled Amens! But amens, though good as encouragers, are not efficient. Action will be.

But there is a step in further advance to be taken. And some of us can perhaps set an example as well as present an argument in favor of that step.

The statute and laws which have been quoted are well enough as far as they go, but they do not go far enough. Nor can they. For they cannot invade personal rights, unless by the exercise of the right of eminent domain more largely than would seem advisable, perhaps.

They cannot provide that whenever a forest owner along a highway changes his woodland to arable or pasture land he shall leave a proper reasonable belt of trees alongside the roadway, *upon his own land*, so that the road may not be deprived of shade and the wayside view of beauty; but we can do it with our own, if we are woodland roadside owners, and our neighbors who are such owners may be persuaded to do it.

To effect this, after or with the enforcement of the quoted acts, is the duty of the day. Let us all address ourselves to it, and, with others or alone, circumtramp our woodland ways, and, finding out where work may be needed and action taken, direct the attention of the improvement societies of our towns or villages to the subject and object, and arouse such feeling and create such a public opinion, by meetings or otherwise, as will convince the wayside woodland owner that he can be a public benefactor, and at the same time benefit himself by sparing the shade or ornamental trees along his front, to fringe with beauty the road that would otherwise be a weary way.

It will not be a hard task to effect this. Many land owners now adopt the practice of so fringing roadways; it should be universal; and we can almost assert that in many cases where the contrary has been done, it has been through thoughtlessness.

The beauty, the utility and the future profit of such a plan seem so plain to be seen and expected, that one could hardly fear failure in advocating it. But there is no time to lose. Every day there is danger that damage may be done that half a century will not repair. If every man and woman here present will give a little time and energy to this beneficent object, it will be accomplished. The man who plants a tree in a proper place is a benefactor prospectively. He who leaves one in its natural, proper place, is a benefactor instantly.

INDEX TO TITLES AND AUTHORS.

PAGE.
Adirondack Forest: Verplank Colvin 142
Andrews, Gen. C. C.: Prevention of Forest Fires . . 179
Barrett, W. W.: North Dakota 103
Berthoud, Edward L.: In Pathless Wood 164
Bessey, Charles E.: Notes on the Sand Hills and Pine Forests of Nebraska 83
Bliss, Henry C.: Street Planting and Shade Trees . . 187
Bush B. F.: Missouri 81
Colby, Prof. James F.: The Forestry Legislation of New Hampshire 147
Colvin, Verplank: Adirondack Forest 142
Conservation of Soil and Water Supply of Hill Countries in Cultivated Areas, T. J. McKie, M. D. 137
Constitution and By-Laws 21
Co-Operative Forestry. George B. James 169
Destruction and Repair of Our Natural Resources. John F. Lacey, M. C. 55
Dubois, Senator Fred. T.: The Need of a Forest Policy for the Western States 47
Economies in Railway Ties. E. E. Russell Tratman . 182
Eliot, Charles: Notes on the New Public Forests near Boston 114
Forest Fungi, Anthracnos of Poplars. Dr. B. D. Halsted 176
Forestry Legislation of New Hampshire. Prof. James F. Colby 147
Gifford, John: New Jersey 93
Halsted, Dr. B. D.: Forest Fungi—Anthracnose of Poplars 176
Hammond, E. W.: Forestry Conditions in Oregon . . 103

PAGE.
Harrison, J. B.: Public Misapprehension of the Forestry Question 158
Higley, Warren Progress of Forestry Legislation in New York 99
Hobbs, John E.: The Location of the Principal Forests of Maine, the Condition of Forestry and the Forestry Movement 79
Hopkins, Prof. A. D.: The Relations of Insects and Birds to Present Forest Conditions 173
Hopkins, Prof. A. D.: West Virginia 110
In Pathless Wood. Edward L. Berthoud 164
James, George B.: Co-operative Forestry 169
Jones, W. Goodrich: Texas 108
King, Prof. F. H.: Observations on the Destructive Effects of Winds and the Protection Afforded by Woodlands and Windbreaks 125
Kinney, Abbot: California 68
Lacey, John F., M. C.: The Destruction and Repair of Our Natural Resources 55
Legislation Favoring the Planting and Protection of Roadside Trees in Massachusetts. Wm. S. Shurtleff. 192
McKie, Thos. J., M. D.: The Conservation of Soil and Water Supply of Hill Countries in Cultivated Areas . 137
McLouth, L.: South Dakota 107
McRae, Thomas C., M. C.: National Forestry Legislation, 62
Members, List of 5
Mohr, Dr. Charles: Alabama 66
Morton, Hon. J. Sterling: Remarks at Joint Meeting Am. For. Assoc. and Nat'l Geogr. Soc., 1896, ... 45
Moses, G. H.: Forest Conditions and Forestry Problems in New Hampshire 89
National Forestry Legislation. Thomas C. McRae, M. C. 62
Need of a Forest Policy for the Western States. Senator Fred. T. Dubois 47
Notes on the New Public Forests Near Boston. Charles Eliot 114
Observations on the Destructive Effects of Winds and the Protection Afforded by Woodlands and Windbreaks. Prof. F. H. King 125

PAGE.
Officers for 1896 3
Pammel, Prof. L. H.: Iowa 77
Parsons, Geo. H.: Colorado 74
Prevention of Forest Fires. Gen. C. C. Andrews . . 179
Proceedings, Special Meetings, Brooklyn, New York, and White Mountains, 1894 23
Thirteenth Annual Meeting, 1894, ... 27
Special Meeting, Springfield, Mass., 1895, ... 30
Fourteenth Annual Meeting, 1896 38
Proctor, Hon. Redfield: Vermont 109
Public Misapprehension of the Forestry Question. J. B. Harrison 158
Publications of the American Forestry Association . . 2
Putnam, H. C.: Wisconsin 112
Relations of Insects and Birds to Present Forest Conditions. Prof. A. D. Hopkins 173
Rothrock, Dr. J. T.: The Forestry Cause in Pennsylvania 105
Shurtleff, Wm. S.: Legislation Favoring the Planting and Protection of Roadside Trees in Massachusetts . . 192
Street Planting and Shade Trees. Henry C. Bliss . . 187
Tratman, E. E. Russell: Economies in Railway Ties . . 182
Troop, Prof. J.: Indiana 76
Vermeule, C. C.: Woodlands and Waterflow in New Jersey 130
Woodlands and Waterflow in New Jersey. C. C. Vermeule 130

0.191

PROCEEDINGS

OF THE

2

Sixth Southern Forestry Congress

HELD AT
SAVANNAH, GEORGIA
JANUARY 28-30, 1924

0.191

PROCEEDINGS

OF THE

2

Sixth Southern Forestry Congress

HELD AT
SAVANNAH, GEORGIA
JANUARY 28-30, 1924

PROCEEDINGS

OF THE

Sixth Southern Forestry Congress

HELD AT
SAVANNAH, GEORGIA
JANUARY 28-30, 1924

O.191

PROCEEDINGS

OF THE

2

Sixth Southern Forestry Congress

HELD AT
SAVANNAH, GEORGIA
JANUARY 28-30, 1924

PROCEEDINGS

OF THE

Sixth
Southern Forestry
Congress

HELD AT
SAVANNAH, GEORGIA
JANUARY 28-30, 1924

THE SEEMAN PRINTERY, INC.
DURHAM, N. C.
1925

OFFICERS

OF THE

SIXTH SOUTHERN FORESTRY CONGRESS

PRESIDENT..................BONNELL H. STONE, *Pfister & Vogel Land Co.*
BLAIRSVILLE, GA.

VICE-PRESIDENT..................P. R. CAMP, *Vice-President Camp Mfg. Co.*
FRANKLIN, VA.

SECRETARY-TREASURER..................R. D. FORBES,
Director Southern Forest Experiment Station
NEW ORLEANS, LA.

ASSISTANT SECRETARY..................J. ROLAND WESTON,
H. Weston Lumber Co.
LOGTOWN, MISS.

CHAIRMAN EXECUTIVE COMMITTEE..................JOSEPH HYDE PRATT,
Director Geological and Economic Survey
CHAPEL HILL, N. C.

CHAIRMAN FINANCE COMMITTEE..................J. K. JOHNSON,
Forester, Great Southern Lumber Co.
BOGALUSA, LA.

CHAIRMAN PUBLICITY COMMITTEE..................J. S. HOLMES, *State Forester*
CHAPEL HILL, N. C.

CHAIRMAN LEGISLATIVE COMMITTEE..................A. B. HASTINGS,
Assistant State Forester
CHARLOTTESVILLE, VA.

EXECUTIVE COMMITTEE—The above officers, together with all former Presidents of the Congress, constitute the Executive Committee.

THE FORMER PRESIDENTS ARE:	*Elected*
COL. JOSEPH HYDE PRATT, Chapel Hill, N. C.	1916
HON. HENRY E. HARDTNER, Urania, La.	1920
MR. ROY L. HOGUE, Jackson, Miss.	1921
MR. W. D. TYLER, Dante, Va.	1922

EDITOR'S NOTE

In view of the delay of twelve months in getting these proceedings published, and because it is necessary to keep the cost of publication within the means of the Congress, it has been decided by the Executive Committee to publish only such part of the proceedings of this Congress as relate to the Naval Stores Industry. This seems most appropriate, not only because Savannah, where the Congress met, is in the heart of the country where this industry has been flourishing for the past fifty years, but even more because the Naval Stores operators attended the Congress in such numbers and contributed in such large part to the success of the meeting. Not only, therefore, have a number of very interesting and valuable papers contributed by the speakers named on the program been omitted, but a considerable part of the discussion as taken by the stenographer has been cut out. The Editor and the Executive Committee of the Congress herewith desire to extend their apologies for taking this liberty with the Proceedings.

J. S. HOLMES, *Editor*

March 15, 1925.

CONTENTS

PAGE

PROGRAM OF SIXTH SOUTHERN FORESTRY CONGRESS.......... 7

INTRODUCTORY BY MAYOR SEABROOK AND COL. PRATT.......... 11

LETTER FROM PRESIDENT COOLIDGE.......... 12

LETTER FROM SECRETARY WALLACE.......... 14

LETTER FROM THE PRESIDENT'S PRIVATE SECRETARY, Hon E. T. Clarke.......... 15

"THE FRENCH NAVAL STORES SYSTEM AND ITS LESSONS," Col. W. B. Greeley.......... 17

"PROLONGING THE LIFE OF THE NAVAL STORES INDUSTRY: THE PRODUCERS PART," L. V. Pringle.......... 27

"CAN THE FACTOR PREVENT RECKLESS TURPENTINING?" H. L. Kayton.......... 30

DISCUSSION: "THE NAVAL STORES INDUSTRY"

- Mr. Thomas Gamble, *Temporary Chairman*.......... 33
- Mr. C. F. Speh.......... 36
- Mr. A. K. Sessoms.......... 36
- Mr. C. S. Hodges.......... 37
- Mr. A. V. Wood.......... 39
- Mr. A. S. Carr.......... 40
- Mr. Thomas Gamble.......... 41
- Mr. J. G. Pace.......... 41
- Mr. Thomas Gamble..........42, 49, 52
- Resolution 43
- Dr. F. P. Veitch.......... 44
- Mr. O. H. L. Wernicke..........47, 49

Mr. J. E. Lockwood 50

Mr. J. S. Holmes 51, 52

Dr. Austin Cary 53

PERSONNEL OF COMMITTEES 53, 54

RESOLUTION ON DEATH OF MR. M. L. ALEXANDER 55

REPORT OF LEGISLATIVE COMMITTEE 56

REPORT OF RESOLUTIONS COMMITTEE 58

REPORT OF COMMITTEE ON PLACE OF MEETING 62

REPORT OF TREASURER 63, 64

APPENDIX I. CERTIFICATE OF INCORPORATION OF THE SOUTHERN FORESTRY CONGRESS WITH LIST OF CHARTER MEMBERS 65

APPENDIX II. BY-LAWS OF THE SOUTHERN FORESTRY CONGRESS 73

APPENDIX III. LIST OF PATRONS OF THE SIXTH SOUTHERN FORESTRY CONGRESS 76

APPENDIX IV. LIST OF REGISTERED DELEGATES ATTENDING THE SIXTH SOUTHERN FORESTRY CONGRESS 79

PROGRAM

MONDAY, JANUARY 28

10:00 A. M.

Invocation—Rev. W. A. Jonnard, St. John's Episcopal Church, Savannah.

Address of Welcome—Hon. Paul E. Seabrook, Mayor of Savannah.

Reply—Col. Joseph Hyde Pratt, President Western N. C. Inc., Asheville, N. C.

President's Address—Bonnell H. Stone, Pfister & Vogel Land Co., Blairsville, Ga.

Topic—The Naval Stores Industry:

"Prolonging the Life of the Industry—the Producer's Part." Address by L. V. Pringle, Vice-President Gillican-Chipley Co., Inc., Biloxi, Miss.

"Can the Factor Prevent Reckless Turpentining?" Address by H. L. Kayton, Vice-President Carson Naval Stores Co., Savannah.

Discussion, led by Thomas Gamble, Editor Naval Stores Review, Savannah.

Appointment of Committees.

1:30 P. M.

Automobile tour of Savannah, followed by an oyster roast at the Savannah Yacht Club, and drive to Tybee Beach.

8:15 P. M.

Illustrated Lecture—"What Goes on Inside a Turpentined Tree," by Miss Eloise Gerry, Forest Products Laboratory, U. S. Forest Service, Madison, Wis.

Motion Pictures—Louisiana Department of Conservation, and U. S. Forest Service.

TUESDAY, JANUARY 29

10:00 A. M.

Topic—Forestry and the South's Business:

"Forest Fires—a Menace to the South Atlantic Ports." Address by Matthew Hale, President South Atlantic Maritime Corporation, Washington, D. C.

"A Business Man's View of the Cut-Over Land Problems." Address by O. H. L. Wernicke, President Pensacola Tar and Turpentine Co., Gull Point, Fla.

"Florida's Forests and Florida's Agriculture." Address by R. W. Bennett, Secretary Standard Container Manufacturers, Jacksonville, Fla.

"The Surest Crop on the Farm." Address by H. M. Curran, Extension Specialist, Raleigh, N. C.

"The Interest of Banks and Trust Companies in Forestry." Address by Eliot Norton, Interstate Trust & Banking Co., New Orleans, La.

Discussion of each paper as presented.

2:00 P. M.

Topic—The Responsibility for Forestry:

"Forestry—a Problem for Us All." Address by David L. Goodwillie, Chairman National Forestry Policy Committee, National Chamber of Commerce, Chicago, Ill.

"The State's Part." Address by member of State Forestry Board, Alabama.

"Can the Hardwood Manufacturer Practise Forestry?" Address by Phil D. Houston, Houston Bros., Vicksburg, Miss,

"Forestry for the Pine Manufacturer." Address by J. M. Camp, Vice-President Camp Manufacturing Co., Franklin, Va.

Discussion of each paper as presented.

8:15 P. M.

Introductory Address—Hon. Clifford Walker, Governor of Georgia, Chairman.

"The Newspapers' Interest in Forestry." Address by Major James A. Holloman, Managing Editor, Atlanta Constitution, Atlanta, Ga.

"France Points the Way to America." Address by Col. Wm. B. Greeley, Chief Forester, United States Forest Service, Washington, D. C.

WEDNESDAY, JANUARY 30

10:00 A. M.

Report of the Secretary—R. D. Forbes, New Orleans, La.

Reports of Standing Committees—Executive, Col. Joseph Hyde Pratt; Finance, J. K. Johnson, Great Southern Lumber Co., Bogalusa, La.; Legislation, A. B. Hastings, Asst. State Forester, Charlottesville, Va.; Publicity, J. S. Holmes, State Forester, Chapel Hill, N. C.

Resolutions.

Elections.

2:00 P. M.

Round Table Conference—State Delegations from South Carolina, Georgia and Florida.

Presiding Officers:

South Carolina—Prof. Andrew C. Moore, University of South Carolina, Columbia, President South Carolina Forestry Association.

Georgia—A. V. Wood, The Downing Co., Brunswick, Vice-President Georgia Forestry Association.

Florida—W. L'E. Barnett, Mount Dora, President Florida Forestry Association.

4:00 P. M.

"The South's Opportunity"—Illustrated Lecture by Dr. Austin Cary, U. S. Forest Service, Washington, D. C.

8:00 P. M.

Tree Identification Contest for pupils of Fifth, Sixth, Seventh, Eighth, and High School Grades, Savannah Schools—Conducted by J. S. Holmes, Chapel Hill, N. C.

Motion Pictures of Wild Life—Louisiana Department of Conservation.

Announcement of Prize Winners.

Proceedings

OF THE

SIXTH SOUTHERN FORESTRY CONGRESS

HELD AT SAVANNAH, GEORGIA

JANUARY 28-30, 1924.

The Sixth Southern Forestry Congress was called to order by the President, Mr. Bonnell H. Stone, of Blairsville, Ga., at 10:00 A. M., January 28th, in the Municipal Auditorium, Savannah, Ga. After an invocation by Dr. S. B. McGlohon of St. Paul's Church, Savannah, the Mayor, Hon. Paul E. Seabrook, gave a cordial welcome to the Congress. "You have wisely selected Savannah as the place of this meeting," he said, "as she is known as the Forest City of the South. We have centered here, as you know, many activities that depend on the raw materials of the forest and you will find here ready sympathy and willing cooperation in the advancement of everything looking to the protection and conservation of the raw materials on which we here are so dependent. You know, no doubt, that Savannah is the premier Naval Stores port of the world. Her lumber interests are also extensive, and there are other activities that are dependent on the raw material that we get only from the forests."

In his reply to the Mayor's courteous words of welcome, Colonel Joseph Hyde Pratt, President of Western North Carolina, Inc., and Chairman of the Executive Committee of the Congress, spoke in part as follows:

Colonel Joseph Hyde Pratt, Asheville, N. C.: The restoration of the Naval Stores Industry, or perhaps I had better say the increase of the Naval Stores Industry, in Georgia is of such importance to Savannah that every man, woman and child in the City and surrounding sections should be asking what can I do to bring this about. The Port of Savannah is largely dependent upon the Naval Stores Industry and no one thing that the City of Savannah and the State of Georgia can do to reëstablish the importance of the Port of Savannah will be given greater results than to build up the Naval Stores Industry.

The first step towards this is for the State to pass adequate legislation for the protection of the forests of Georgia from fire.

The question of re-forestation is being agitated throughout the whole country but no State is in a position to undertake or even to consider re-forestation until legislaion has been passed that will insure the protection of the forest from fire. Re-forestation is necessary not only for the Naval Stores industry, but to insure the South of an adequate supply of lumber. Through the investigations of expert Foresters of the U. S. Forest Service it has been determined that not only can the long leaf pine be reproduced in Georgia and other Southern States, but that the Slash Pine which is a more rapid growing tree than the Long Leaf Pine and almost equal in its turpentine product, can be grown successfully in the South.

The coöperation of the Federal Government in acquiring large areas of land in the South for the production of timber which are designated as National Forests should be an incentive for the State to acquire areas for State Forests to be used for the same purpose. The Federal Government has already acquired 1,500,000 acres of land in the Southern States for National Forests. Of this amount 360,000 acres are in North Carolina, and during 1923 there were disbursed amongst the Counties of North Carolina, in which National Forest areas occur, sums of money representing 25 per cent of the income of the National Forests which was equal to approximately the property tax of the County on the land area in the County at an assessed valuation of $5.00 per acre. This is the promised income in lieu of taxes.

The following communications were then read.

LETTER FROM PRESIDENT COOLIDGE TO THE CHAIRMAN OF THE EXECUTIVE COMMITTEE

THE WHITE HOUSE
WASHINGTON

November 13, 1923.

My dear Colonel Pratt:

It is a matter of sincere regret to me that I am unable to attend the meeting of the Southern Forestry Congress to be held at Savannah next January. This organization has undertaken a most commendable public enterprise in awakening the people of the South to the value of their forest resources and in bringing them together for mutual counsel to the end that these resources may be perpetuated. I am informed that the Southern Forestry Congress has been identified with most of the progressive developments toward forest protection and reforestation which have been launched in the Southern States during recent years; and that its recurring sessions have become clearing houses for the discussion of public and private developments in forestry, thus rendering an admirable service both to your own region and to the entire Nation.

It is scarcely necessary for me to emphasize the importance of reforestation in the United States. The American people came into the possession of the greatest wealth in virgin timber with which any people in the history of the world was ever endowed. Our unstinted use of our forests has made us dependent upon their products in agriculture, manufacturing industries, and living standards to a degree that is not paralleled elsewhere in the world. But, because we have not as yet learned to grow timber in any degree commensurate with our use of timber, we find ourselves confronted with an approaching shortage of raw forest materials.

The necessity of moving aggressively toward the growing of timber both as a public activity and through the encouragement of private reforestation is probably greater in the States covered by the Southern Forestry Congress than in any other portion of the Union of comparable size. With an aggregate area of forest land or potential forest land in excess of 220 million acres, with a remarkable variety of valuable forest trees, and with climatic conditions exceptionally favorable to the growth of timber, it is not wide of the mark to say that this region contains more than half of the future wood producing resources of the United States. A large portion of the forest land of the South has already been cut over. In many sections you are experiencing the exhaustion of the original supplies of virgin timber, the moving out of sawmills, and the consequent loss of industry and population. You are face to face with the problem created by enormous areas of denuded and idle land. In the economy of the South itself and in the economy of the entire country, it is imperative that the portion of these areas which is unsuited for agriculture shall not remain land without a crop.

The development of practical ways and means for securing timber growth is a matter of the highest importance which should more and more enlist the efforts of our national and state governments and of our citizens. Consequently, I can but wish God-speed and the largest measure of success to the Southern Forestry Congress.

Very sincerely yours,

(Signed) CALVIN COOLIDGE.

Col. Joseph Hyde Pratt, Chairman
Executive Committee,
Southern Forestry Congress,
Chapel Hill, North Carolina.

LETTER FROM THE SECRETARY OF AGRICULTURE

DEPARTMENT OF AGRICULTURE
WASHINGTON

January 17th, 1924.

Colonel Joseph Hyde Pratt,
Chairman, Executive Committee,
Southern Forestry Congress,
Chapel Hill, N. C.

Dear Colonel Pratt:

Let me express through this letter my very real appreciation of your invitation to be with the Southern Forestry Congress at its meeting in Savannah this month, and also my profound regret because I am not able to do this.

Although I shall not actually be with you I need not say, I hope, that I am heartily with you in your aims and purposes. To my mind, the Southern Forestry Congress is performing a very real, a very necessary, and a very vital service not only to the South but to the entire country.

So far as the forestry situation is concerned, this country has but little time to delay before applying remedial measures. We have danced overlong to the tune of "Endless Resources," little realizing that the piper must some day be paid. We have reduced our original 822,000,000 acres of virgin forest land to less than 138,000,000. This land is being cutover now at the rate of about 10,000,000 acres yearly.

It would seem bromidic indeed to say today, especially to such a gathering as this, that forest land is one of our basic national resources and that our national welfare depends upon its productivity. Yet the fact that from a quarter of a century to more than a century is required to mature the forest crop has a significance that is neither widely nor deeply realized. Shortages in forest-grown material cannot be rectified in a season or two like shortages in wheat or cotton. If the people of the United States wait until the injury to social and industrial well-being for lack of wood crops is overwhelming, the loss in time before any remedy could be made effective would create little short of a national disaster.

In furthering tree growth on a national scale it must be realized that an obligation rests upon the public to reduce the forest hazard by legislation and by policy functions directed at the origin of forest fires, and also to assist land owners in the cost of fire control and fire suppression. The public has a very specific obligation to adapt the taxation of forest growing land and what it produces to the reasonable requirements of an undertaking which requires for its harvesting more than a quarter of a century.

The results of treating our timber as a mine rather than as an ever-renewable crop has been to leave 81,000,000 acres of forest land largely barren, 250,0000,000 acres that are only partially productive, and each year add to these from 5,000,000 to 10,000,000 acres.

Through the establishing of forests that are permanent, abundant, and well distributed, this country must and shall be placed upon a self-sustaining basis. I hope and confidently trust that this day may not be too long delayed. I know that the farsighted, well directed efforts of such an organization as yours can do much toward hastening the dawn.

Very sincerely yours,

(Signed) HENRY C. WALLACE, *Secretary.*

LETTER FROM THE SECRETARY TO THE PRESIDENT

THE WHITE HOUSE
WASHINGTON

January 12, 1924.

My dear Mr. Forbes:

Your letter of December 29th, transmitting resolutions adopted by the Fifth Southern Forestry Congress, is before me. I have been at some pains and effort to examine into this matter somewhat carefully. I think I can best answer it by forwarding to you the substance of a letter written by the Secretary of Agriculture, Mr. Wallace, to whom the resolutions were referred. The essential features of Secretary Wallace's letter I am enclosing herewith.

Most sincerely yours,

(Signed) E. T. CLARK, *Secretary.*

Mr. R. D. Forbes,
Secretary, Southern Forestry Congress, Inc.,
323 Customhouse,
New Orleans, La.
Enclosure.

QUOTATION FROM A LETTER OF SECRETARY WALLACE

"As to Federal forestry legislation, the resolution covers practically the provisions of the bill introduced in the House of Representatives on February 7, 1923, by Hon. John D. Clarke, of New York. Before introducing this bill, Mr. Clarke submitted a draft copy to President Harding, who gave it his approval in a letter to Mr. Clarke, dated January 24, 1923. I also heartily approved that bill, and am now prepared to advocate the passage of the bill (S. 1182) similar in many respects, introduced on December 15 by Senator McNary, Chairman of the Select Committee on Reforestation of the United States Senate, which, for the past year, has held hearings in our different forest regions and given much thought to the subject. This bill would authorize, among other appropriations, appropriations as large as $2,500,000 each year for coöperation with the States in protecting forest lands from fire and in studying the effects of present tax laws upon forest perpetuation, which is an amount more nearly commensurate, in my opinion, with the importance and seriousness of these problems.

"The resolution refers to research conducted by the Forest Products Laboratory and also that of the Federal Forest Experiment Stations. The purpose of the latter is to secure a technical basis for the growing of timber, and of the former to secure the scientific information necessary to reduce waste and permit the effective utilization of wood. The present drain upon the forests of the United States through cutting and fire is estimated at approximately 25 billion cubic feet annually. At the present time this drain is being replaced by new growth only to the extent of 6 billion cubic feet, or approximately one-fourth. By a series of simple measures, such, for example, as universal fire protection and the leaving of seed trees where necessary to insure a new timber crop, it would be possible ultimately to increase the growth of the forests of the United States to approximately 14 billion feet. The gap between a possible growth of 14 billion and 25 billion cubic feet can be made up only by intensive forest management. Such management must depend upon a technical knowledge of trees and forests of a character which can be secured only by forest experiment stations. With the necessary basic information, it would be possible ultimately to grow upon the present area of forest land an amount of timber slightly in excess of the present drain. The place of the forest experiment station is, therefore, to furnish the scientific basis upon which, alone, timber growth can be increased from 14 billion to 25 billion cubic feet. In a number of important forest regions we now have no forest experiment stations, and in all of the remainder the force and equipment is so limited as to make it possible to cover only a part of the most urgent problems and that in an unsatisfactory and inadequate way.

"Twenty-two and one-half billion cubic feet are cut from our forests each year and out of this total we waste, avoidably and otherwise, about 9 billion. By the elimination of obvious waste in the woods, the manufacture of lumber, and in its remanufacture and use by the general application of technical knowledge already available, and by thoroughgoing research in the properties, protection, and utilization of wood, it should be possible to save at least 6½ billion board feet of lumber alone each year and additional amounts of other material. This saving is essential to extend the life of our present timber supply and thus help to bridge the gap between the existing virgin forests and new timber crops. Such a saving should mean greater profits to manufacturers and by increasing the preparation of the crop which can be utilized it should help to make timber growing more profitable. The research which will make possible a large part of the saving is, broadly, the function of the Forest Products Laboratory. But the Laboratory with its present personnel and equipment is able to cover only a part of the most urgent problems which underlie the effective utilization of timber and the reduction of waste.

"The recommendation for the continued acquisition of forest land by the Federal Government and for an appropriation for that purpose of at least two million dollars is in accord with the views of the National

Forest Reservation Commission and of the Forest Service. While present financial conditions operate against an appropriation as large as that recommended, the members of the Southern Forestry Congress no doubt will be gratified to know that the budget for the fiscal year 1925 carries an item of one million dollars for that purpose, this representing an increase of $550,000 over the appropriation for the present year.

"There is complete accord between the War Department and the Department of Agriculture on the subject of devoting to National Forest uses the areas suitable for such uses which were acquired for military purposes during the war but not at present needed for such purposes. Careful examinations have been made of the majority of the more important of such areas; the reports thereon have been reviewed by a joint committee representing both Departments, and the Secretary of War has already given his approval to legislation which will make a number of larger camps National Forests, subject, however, to unhampered use for military purposes should the need arise. I am sure that the progress in this line is in complete accord with the wishes of the Southern Forestry Congress and that the results will meet their highest expectations."

THE FRENCH NAVAL STORES SYSTEM AND ITS LESSONS

COL. W. B. GREELEY

CHIEF, U. S. FOREST SERVICE

It is apparent to all students of the situation in the southern pine forests that the time has come for the naval stores industry of the South to look very keenly into its future, to take stock of its methods, and to give thought to the naural resources upon which it is dependent, with a view to shaping its course to meet a radical change in circumstances. I believe that our industry has much to learn from the French in this preparation for the future. In order that we may fairly decide whether or not this is true we might take a look at the present situation in the American naval stores industry and compare it with the situation in France. Then, if possible, we will ascertain the factors that are accountable for the great differences that exist. When the principles that underlie the success of the French industry have been clearly set out where we can see and weigh them, we can consider the practicability and desirability of their application to our conditions.

The American naval stores industry has dominated the world's trade in those essential commodities, rosin and turpentine, since early colonial days, but the industry is now on the wane. The crest of production has passed and the end of the industry as a major activity of the South is definitely in sight. The industry as we have known it, is doomed for the simple reason that the old stand of longleaf and slash pine from which the raw product is obtained is about to be exhausted and no adequate second crop has come to take its place in continuing the supply. Such second growth as is present bids fair to be removed from consideration at an early date through the use of methods not adapted to realizing its full value.

The once green forest of longleaf pine that covered the coastal plain from Virginia to Texas is now sadly depleted. The best figures available show that of the original longleaf pine forest which covered one hundred to one hundred and thirty million acres, only fifteen million acres are still uncut and this remainder is being cut over at the rate of two million acres per annum; a decade will see its practical finish. Second growth timber is being cut also as fast as it reaches merchantable size. Wood turpentine can be produced from stumps and tops and this form of production, undoubtedly, has a future of promise, but the gum turpentine and rosin industry must have green timber to work on, and the passing of the longleaf pine forest automatically chokes it off at the source.

The output of naval stores fluctuates from season to season but has been gradually falling since the peak year of 1909. The number of turpentine farms is decreasing. Each year an increasing number of turpentine operators must give up turpentining and go into something else, because no timber can be found on which to place cups. Operators have followed the longleaf south-ward to the Everglades of Florida and westward to the plains of Texas and, being thrown back by these outward limits of the species, are now combing over afresh their hunting grounds of long ago, picking up scattered pieces passed by before as too insignificant or too poor to work and supplementing them with crops of cups placed on saplings that have grown up since the first operation. In the last five years operators, particularly in Georgia and since 1920 in the Carolinas, have been depending upon second growth, frequently immature, for a large part of their output. Unfortunately because of the method of working followed, they are rapidly destroying the main hope for the future.

While the distribution and financing of naval stores has been a stabilized part of the industry for a great many years as is shown by the history of this city, the operations in the woods have been of a transient nature, always on the move, ever in the backwoods. The thought and practice have been to get the maximum amount of gum out of the trees in the minimum of time and move on to pastures green. There was ever, until the last few years, plenty more timber just beyond the horizon, westward or southward, ready to be worked and nobody worried much about the future. Trees were seldom worked more than four or five years and stills were seldom operated in one location for more than ten years, many for less. The longleaf pine belt from Virginia to Texas is spotted with thousands of old turpentine camps, of which nothing exists now save a few bricks where the old still kettle stood. While there may be some, I do not know of a town that has grown up from a turpentine still and has been maintained permanently as such by woods operation for naval stores. I know of no permanent system of roads nor of any permanent schools or churches that have been built and maintained by or for a population depending upon turpentine operations.

The typical turpentine camp is of flimsy, temporary construction set away off in the wilderness. Such a place usually fails to satisfy the natural cravings of the average American citizen for what he considers the common necessities of life. Partly due to the isolation and the comparative hardships of the life, the woods end of our industry is frequently embarrassed by the labor situation. The only class of common labor attracted is difficult to hold; the annual labor turn-over in the average camp is enormous. Recruiting his force often takes as much of a manager's time as any phase of the operation. The supply of labor is fluctuating and often insufficient, and by the same token, wages, the biggest item in the cost of naval stores, may vary tremendously from year to year.

Now let us take a look at the French Industry. I shall not attempt to describe here the French methods in detail nor burden you with statistics of yields, costs, etc. I simply want to give you a bird's eye view of the industry as a whole. As you know, French naval stores are produced almost exclusively in the Landes Region of France from an area of less than two million acres. The Landes was originally an enormous swamp in the rainy season and an arid, sandy desert the balance of the year. It was reclaimed, drained and planted to maritime pine, starting about one hundred and twenty-five years ago. The project was carried on in the face of many obstacles and the reclamation of this land and its afforestation stand today as one of the greatest and most successful efforts on the part of man to radically change the face of nature.

The maritime pine is not as good a producer of gum, nor is it nearly so valuable for saw timber as our longleaf and slash pines. If you can imagine such a thing, it looks like a cross between a loblolly and a spruce pine. Is is a fast grower and a prolific seed bearer. The French originally planted this trees in the Landes, though by far the greater bulk of the present forest is the result of natural reproduction, the forests originally planted having been worked out and cut for saw timber and their place taken by a second crop. The pine reaches saw timber size at around seventy years from seed, when it is cut, yielding from seven to ten thousand feet per acre of saw timber and a considerable amount of ties, poles, cordwood, and charcoal in addition. This alone is a mighty good crop for a soil originally as poor as beach sand, but the raising of saw timber is really a side issue with the French timber owner in the Landes. His main crop is turpentine and rosin.

The French developed their method of gum extraction and the system of management of their turpentine orchards on the basis of timber production rather than timber mining. Their methods are the result of over a century of experience in which there has been ever present the grim necessity of replacing old crops with new on the same ground, for they have never had any reason to believe that their stock of turpentine timber was inexhaustible. One hundred years ago they were where the naval stores industry of the South now finds itself, only in a very much harder case.

Now after a hundred years or more of existence what are the conditions existing in the French industry? Let me, as briefly as I may, paint a word picture of the Landes as I saw it in 1917 and 1918. It is a gently rolling sandy plain roughly triangular in shape, containing slighlty less than two million acres, in the southwest of France near the coast, covered from boundary to boundary with an unbroken forest of maritime pine in all stages of development from seedling to saw timber, every acre of which has either been planted or is the result of seed from planted trees. North and south through the heart of this area runs one of the main trunk line railroads of France from which, every ten or twelve miles, feeder rail lines branch out to the east and west penetrating to the outer boundaries of the region. As extensive as this system of railroad transportaion is, it is supplemented by an even greater mileage of roads, of which the greater part is hard surfaced. I doubt if there is a body of timber in the whole region that is more than three miles from a railroad or a paved highway.

Every few miles along these railways and roads one comes on a little village set in a narrow fringe of fields and grass land and surrounded by woods. The heart of each village is a turpentine still and a wood using plant of some kind. The villages are of brick and stone with red tile roofs. Large churches, schools and public buildings adorn their plazas and business is brisk indeed on their well paved "main streets." These villages correspond directly with our turpentine camps but with what a difference! Every now and then the traveller comes to a small city of from twenty to thirty thousand inhabitants, of which there are several in the Landes. These are the centers of marketing, distribution and government for the adjacent territory; and the bustle and stir of business reminds one more of some wide-awake western city than of what we would naturally expect in old and settled France. The Landes supports a permanent population of 1,400,000, half as many people as the whole state of Georgia, although Georgia contains nearly nineteen times the area; and these folk are considered among the most prosperous and contented in the whole of France. It is no exaggeration to say that every man, woman, and child of this population derives his daily bread directly or indirectly from the maritime pine forests that surround him, and it is a mighty good living I assure you.

Since the forests are permanent, the turpentine plants are permanent. The structures are of steel, brick and concrete and embody the latest thought in the processes of manufacture. The continual use, over and over of the same land for growing timber crops and extracting gum and timber products requires and justifies an extensive and permanent system of roads; the continuous production of turpentine, rosin, lumber, mine props, and cordwood maintains standard guage railroads, and the never failing opportunity for labor year around and in fixed location attracts a steady localized supply which many years ago became the permanent population of the country. The output of naval stores from the Landes has been steady and uniform for many years. It was, of course, somewhat upset during the war, but seems to have fully recovered since. The two million acres of the Landes, no larger than four or five average Georgia counties, produces one-fourth as much naval stores as does the whole South. The future of the industry and of the region is assured and the outlook is all the brighter because of the gradual weakening of America's dominance in the world's naval stores markets that must take place as we near the exhaustion of our source of supply.

Now what is the secret of the success of the French industry? Does the answer lie in the soil or the climate, or the species, or in intensive European conditions generally? It does not. Their climate is not as good as ours; our season is longer as a rule and a good deal warmer. Their soil is very much inferior to even that of our poorer sand hills and they have none in the Landes that compares with our better clay soils. The maritime pine is inferior to longleaf and slash pine in every respect. It does not produce as much gum; its lumber is poor indeed compared with that from our pines; it is not as hardy against fire, insects, and disease; and on our better soils both slash and longleaf pine should grow as rapidly, and under proper care, more rapidly than the maritime pine. Is it the method of extracting the gum, or the way the gum is converted into turpentine and rosin, or is it the happy combination of these two features and the high yield and value of the additional forest products such as lumber, mine props, poles, etc.? These all bear an important part but the prime factor in the French success is their acceptance of the principle that timber growing comes first, that there must be an uninterrupted succession of forest crops, and that each operating unit must be built up on a continuous yield of gum as well as lumber and wood by grouping about it a suitable acreage of each stage of forest, from seedlings to full grown trees. All the rest of their system has been worked out to fit in with this governing principle, or has followed as a natural result. It is this principle, rather than any detail of cupping or chipping or climate or manufacture that marks the fundamental difference between our practice and the French system.

It is perhaps true that the French, keen thinkers as they are, were driven to the adoption of this principle by the limitations of the situation as they found the Landes a hundred years or more ago. It may be contended that, facing no such limitations, but on the contrary finding themselves possessed of an apparently inexhaustible supply of turpentine timber, already mature and often in demand for lumber, the pioneers of our industry were fully justified in following a different principle. We won't quarrel over that; what has passed is history but we are now facing a set of conditions that differs radically from what our forebears found. The inexhaustible timber is about gone and the gum naval stores of the South must in the not far distant future be derived from second growth timber. We are today where the French were when they started, and the fundamental principle they have followed so successfully is now as sound for us as it has proved to be for them.

Not only is it sound, but, in the opinion of men much more closely in touch with the conditions in the southern pine region than I am, it is now possible of application over a considerable portion of the naval stores belt.

To apply the principle of continuous production profitably, either here or in France, it must, of course, be brought down to the individual unit of operation, and the methods of extracting gum and utilizing timber must be adapted to take full advantage of the conditions in the particular operation without seriously affecting the welfare and growth of the timber. This is about how it is done in the Landes. A well established turpentine plant owns its timber in the form of fifteen or more tracts or lots, each of which has a stand of a different age—for instance, tract number one will be covered with a stand of five year old seedlings; tract number two with young saplings ten years old; tract three, fifteen years old, and so on. Tract fifteen will be a stand seventy years old. The stands below twenty years of age, which are nearly always the result of natural seeding and very dense, are gone over periodically and thinned out by cutting to speed up the growth. In the tracts that contain stands twenty to thirty years old the thinning continues but the trees to be removed are first turpentined heavily, then cut and sold. The object of each of these thinnings is to remove the poorer trees and leave the best trees to grow at an accelerated rate. As a consequence the tract that contains the thirty year old timber shows a fine, evenly spaced stand of fast growing, big crowned trees, each as sound as a dollar and ready for the long time working now to commence. There are as a rule from seventy to one hundred and twenty of these trees to the acre, depending on the quality of the soil.

Each of the tracts that contain thirty year and older timber is worked as follows. One face three and one-half inches wide is placed on each tree and is worked for four years. The tract is then abandoned for from two to three years in order to rest, the operation being shifted in the meantime to some other lot that has had its rest. After the period of rest, another face is made on the back of the tree and working continued four years. The tract is again rested, then a new face is started; and so on during a period of forty years until the tree reaches seventy years of age when it is generally ready for the sawmill and is felled and manufactured. There is always sufficient seed in the duff after the felling to bring on a heavy growth of seedlings within a year after felling. Planting is only resorted to in case fire sweeps over a young stand before it has reached seed bearing size.

The chipping is done every five days, oftener in July and August, with a tool that looks something like a twisted foot adze. The chipping is about one-half inch deep and the face resembles somewhat a shallow gutter extending up the tree. The gum is caught in a earthenware cup like ours, but smaller. The narrowness of the faces and the rapid growth of the trees allow a rapid healing of the face so that continued working is possible without seriously retarding the growth of the tree or rapidly reducing its productive capacity.

By this process of management and chipping the still receives a steady income of gum, the sawmill a steady income of sawlogs, and the wood yard a steady income of mine timbers, poles, posts, ties, fuel wood and charcoal, and at the same time the worked out lots are being reforested; and a new crop is being grown with which to continue the circle of production.

I have given you this account of French chipping methods simply to round out the description of their manner of operating. I am certainly not going to advocate any wholesale acceptance of French methods for use in this country for I am satisfied that once the principle of continuous forest production by units of operation is accepted, American ingenuity will invent methods of chipping, cupping and utilization that will give the desired results and at the same time be adapted to the circumstances of labor, markets and finances peculiar to our country. The Forest Service has been conducting a comparative test of the French method of chipping on the Florida National Forest for the past several years, and a bulletin concerning it is now being prepared for the press. The author of that bulletin, Mr. E. K. McKee, is at this meeting and I will not steal his thunder. I am sure you will find his conclusions interesting. *Seeing is believing. Proposal for trip to France.*

To start one of their sustained yield units of operation, the French had to go through the laborious process of draining the land and then planting it. Men of vision have the opportunity now and right here in Georgia, as well as in other parts of the naval stores belt, to build up such units by the purchase of land already satisfactorily stocked with young growth at the price of the land alone. The greater part of the vast acreage of cut-over pine land in the South will not be needed for agriculture for many years; a very large part of it will never have a higher use than that of growing timber crops. With soil, climate, species and location near the great markets all in its favor, the opportunity for profitable timber growing on these lands is unquestionably great. When we add to these favorable factors the possibility of making the trees pay their way, and a profit besides, through producing naval stores while they are growing to maturity. It can be said with truth that the South stands first in the United States as a field for forestry.

Nor is the production of naval stores the only medium through which pines may be made to pay early returns and yield revenue while growing to maturity. The paper industry is confronted by the necessity of finding new woods from which to manufacture pulp and it is spreading south. Already seventeen pulp and paper mills are in operation in the longleaf belt with a capital investment of over $15,000,000, and more are coming. Pulp mills make a ready market for the small trees worked out and cut in the process of thinning the growing stands as well as for the older material that sawmills cannot utilize. Then, too, there is the wood turpentine industry with its demand for stump wood and light wood as a market for one of the products of timber growing. Properly managed grazing of cattle and sheep is another source of profit from forest lands. A large proportion of the income of the Government's National Forests is derived from this source.

There is every reason to look with optimism for steady advances in the value of standing timber in the country at large, and especially of longleaf pine with its dual use. Average stumpage prices for this species have doubled since 1910 and the value of the second growth has increased even more in the same period. As an indication of the rise in the values of turpentine leases, I may cite our experience on the Florida National Forest. In 1909 we granted three year leases on virgin timber at the rate of $50 per thousand cups. In 1924 our leases were made on the basis of $275 per M for virgin timber. When our foreign customers have covered their purchasing power, it is reasonable to look forward to a greatly increased demand for the products of our pineries and I believe that we may expect that the trend in values will continue to be upward for a number of years to come.

If I have made myself clear, it must be apparent that the production of naval stores should be an essential part of the practice of forestry in the southern pineries. It has been, I know, the fashion for many years to damn turpentine orcharding as a destructive agency in our pine woods, but as I said before, let's forget the past and prepare for a new era. To continue to exist at all, this industry must radically change its viewpoint and its methods. By so doing it will at once cease to be an agency of destruction, a plague of locusts as it were, and become a direct and powerful factor in forest conservation, the key industry that will make the rejuvenation of southern pine lands a practicable and profitable thing. When this comes to pass—and not before—we will see the chief emphasis placed upon the continuous production of resin-making trees rather than where it is now, upon the marketing of their products. Then we will see turpentine farming acquire the standing it has in France as a permanent, progressive and lucrative calling in which men engage generation after generation with profit to themselves and with the satisfaction and self-respect that comes of knowing that they are building and not destroying.

"PROLONGING THE LIFE OF THE NAVAL STORES INDUSTRY—THE PRODUCER'S PART"

MR. L. V. PRINGLE

VICE-PRESIDENT GILLICAN-CHIPLEY CO., INC.

This is a very important problem which confronts one of the great industries of the South in which there is engaged about 1,200 producers and many thousand employees all of whom are face to face with the problem of prolonging the Naval Stores Industry producing gum turpentine and rosin from living pine trees, if not they must find other means of livelihood.

The naval stores industry is an essential industry. Essential in the economic life of the South as it represents actual creation of wealth to the extent of forty-five to sixty millions of dollars annually. Essential to the consumer as it furnishes him with a raw material much cheaper than other raw materials which he would be compelled to use. It replaces fats and tallows so that oils are available for edible purposes. Replaces imported fossil gums and makes possible the use of china-wood oil, making a cheap, efficient, waterproof varnish. Many industries are built on the expectation of having available a continual supply of these materials.

It is necessary, therefore, that our raw material—the tree, be made available for future production. This means the efficient utilization of the trees now standing and this in turn means to work a tree in such a way that it will produce the amount of turpentine and rosin which it is capable of producing before being cut. This cannot be done by tapping the small, immature tree. This practice means the using of the tree ahead of time and, therefore, depriving the country of a source of supply in later years.

There is another phase to the question and that is, the working of the small timber creates an erratic ratio of supply and demand, giving in one year an over-supply with a low market and the next year an under-supply with a high market, with the consequence that neither the producer or consumer are benefited. Moreover, putting it on the ratio basis, it takes an investment or expense of 100 cents operating such timber and the best returns possible to expect at the prices which the consumer can afford to pay would be about 75 cents, causing a loss of 25 cents. Therefore, instead of actually creating wealth those producers are absorbing wealth from the South. Moreover, it is not good business. Operators should inform themselves better as to the statistical position of their product and operate with a view of stabilizing market conditions and prevent violent fluctuations existing from over production.

The producers for many years past have gone along in a careless and wasteful way paying little or no attention to conserving the timber, disregarding the fact that the supply is being rapidly depleated by wasteful methods of operation. The chief of which is the working of small immature trees which are not large enough to make a profitable yield, thereby, making a loss to the producer and in many cases consuming all the profit derived from larger trees which not only results in a loss to the operator doing the work but works an injury to his neighbor as well as all who are engaged in the business, as the product from small unprofitable trees is placed on the market and reduces the price. When the sensible thing to have done would have been to work only such size trees as will produce sufficient to give a profitable return on the operator's investment.

The worst feature of operating a small tree is the fact that an asset has been consumed that if left until it becomes of proper age and size would be of greater value and prove instrumental in prolonging the life of the industry on a profitable basis.

The size tree from which a profitable yield can be expected has been worked out and fully demonstrated by the Forestry Department under the able supervision of Mr. Austin Cary which clearly shows that no tree under 10 inches—15 inches from the ground should be worked for turpentine. I make the assertion without fear of successful contradiction that if only trees of the size above mentioned had been worked since the close of the World War that the operators would not be in the deplorable financial condition the majority of them find themselves today. I fear the operators are not profiting as they should from the splendid work being done by the Government in the National Forest Reserve at Crest View, Florida, which is further developed by practical experiments being made at Stork, Fla., and other points from time to time by Mr. A. Cary. I strongly recommend that all operators procure and study closely all bulletins covering these experiments. If the life of the industry is to be prolonged as it should be more conservative methods of chipping must be adopted. It has been clearly demonstrated by the Government in experiments conducted by its efficient Microscopist, Miss Olose Gerry of Forest Products Laboratory, that we have been chipping too deep and climbing the tree too fast both of which detracts from the vitality of the tree and retards production and consumes chipping surface on the tree that should be conserved for later production. A place under my supervision has been operated this season with the chipping done by the method recommended by Miss Gerry namely ½ x ½ with most gratifying results as to yield and conserving of timber. I think all factors and bankers should coöperate in the matter of conserving small timber to the extent that no advances would be made any operator who would not agree to only work timber of the proper size. Think how foolish it is to spend 100 cents operating timber that at best can only produce 75 cents which only results in reducing the price and in so doing labor is being used that should be utilized for other profitable work.

If we hope to prolong the life of the industry the time is now at hand when we must resort to reforestation and conservation of the young timber which the South Atlantic and Gulf States are so wonderfully blessed with soil and climatic conditions suited for reproducing.

Let's all return to our homes with a firm resolve to coöperate to the utmost to conserve our young timber for the benefit of present and future generations.

CAN THE FACTOR PREVENT RECKLESS TURPENTINING?

MR. H. L. KAYTON

VICE-PRESIDENT CARSON NAVAL STORES COMPANY

In order that I may properly approach the subject which has been assigned to me, it will first be best to consider exactly what is meant by "reckless turpentining." I should say that the term would apply not only to the wasteful cutting and cupping of small timber, the rapid draining of the trees by chipping too deeply and too frequently, but also the failure to properly protect the timber from the winter and early spring fires which annually visit the forests. Factors may exercise actual control only over a comparatively small percentage of operators and are loath to apply pressure even under conditions where they are in position to dictate to the operator the methods which he should employ. The factor would much prefer adopting a policy of education for a producer who is not susceptible to the improved methods which are now being evolved is naturally an undesirable patron and one who must eventually fail to survive.

It may not be amiss to take a step backward into the past and trace the naval stores business from the early days up to the present time. We find records showing that naval stores were made through the efforts of the early English settlers, who secured pitch tar and rosin from the then vast pine forests which overspread the Virginia shores. The industry has been migratory and has steadily moved southward, then westward, as the virgin forests fell before the axes of the lumbermen, after having been first bled for rosin and turpentine. It has been barely fifty years since the naval stores business was firmly established in this territory and it is less than fifty years since the pioneer factorage house was established in Savannah. For the first twenty-five or thirty years of that period production in this territory developed rapidly and timber was so plentiful and so readily available that turpentine leases could be obtained at very low cost and as a consequence slight capital only was necessary for the establishment of a turpentine still.

As the timber became depleted farther north, the North Carolina operators moved into Georgia and factorage houses in

Savannah were organized and prepared to furnish such accommodation as was needed by the naval stores producers. The facilities required for concentrating and distributing receipts of rosin and turpentine were promptly established and Savannah has remained the chief port for naval stores and bids fair to maintain her premier position.

In view of the low cost of turpentine leases and supplies, loans by factors were comparatively small. Losses were negligible and despite the fact that producers generally were men of little or no education and had not been afforded the opportunity of business training, the profits accruing to them and consequently to the factors were sufficiently remunerative to warrant the factors taking what we would today consider unsound risks. The factors were prepared to furnish their patrons with their entire requirements of supplies, food-stuffs, tools and equipment and as few of the operators enjoyed established credits they were not in position to secure their needs from sources other than the factors. At that time there were practically no country banks, hence banking accommodation was not available, and even actual payroll money was obtained from the factors, who sent it out by express or registered mail as needed.

Conditions gradually changed and the personnel of the naval stores producer has been developed into a type which in intelligence and business capacity compares favorably with the personnel in other lines of industry. Many producers are men of substances who have acquired a goodly share of wordly goods, in fact, must be men of means to control considerable acreage of timber at present values. They are frequently leaders in their communities and many hold public office. They can secure their supplies where they please, can market their product when and as they see fit, and need not market through the factor unless they consider it to their best interest to so do. The independent operator is no longer the exception, though possibly not yet the rule.

Naturally the factor has changed also and where formerly his hold upon his patron was through the purse strings, today his hope for success lies in his ability to perform service. His supply business is obtained only in the keenest competition with modern merchants and in many cases he finds it impossible to sell goods to an otherwise staunch patron. He must himself be familiar with modern improvements and discoveries and acquire knowledge in such way as he can so that he may intelligently discuss with his patrons the newer thoughts and suggestions which are being thrown out by the research workers of the U. S. Forest Service. Improved methods of chipping the trees have been discovered through painstaking tests extending over a period of years, modification of the tree workings are recommended by the Forest Products Laboratory Microscopist, who has exhaustively studied the structure and processes of the pine, better gathering and stilling methods are taught by the Department of Agriculture's Naval Stores demonstrator, and the factor who desires to prove of value to his producer patrons must coöperate with the various governmental agencies, exchange experiences therewith and act as an intermediary in the dissemination of practical, useful and beneficial discoveries. The factor must further take upon himself the duty of educating his clientele in the desirability and necessity of fire prevention, and creating among the naval stores producers a sentiment in favor of a state organization for forest fire control. Therein lies the hope for permanence of the industry.

I think I may safely assert that fifty per cent of the present day producers are men who operate entirely upon their own capital and are independent. Possibly another 25 per cent seek some accommodation, and borrow from factors since the terms of repayment are more liberal than those offered by banks, but these men could readily secure the funds from other than factorage sources if they so desired. Many of the remaining twenty-five per cent offer their business on a desirable basis and only a small number of present day operators are of the wholly dependent type. It should be obvious, therefore, that the power of the factor to control the volume of production is highly circumscribed and limited mostly to such influence as he can exert in the way of advising for or against curtailment or augmentation of operations. The factor is called upon constantly for his views on market conditions, his ideas about the size of the next crop, and is looked upon as a fount of wisdom from which the likely happenings of the future may be freely drawn in copious streams. He must keep himself well-posted on world conditions and continuously study the changing situations which effect the demands for rosins and turpentine. Even with the small group of dependent operators his control goes but little farther than an expression of opinion as to the desirable course, for not infrequently, despite a desire for crop reduction, the situation of the dependent is so precarious that the attempt to force curtailment might cause disaster. A turpentine location heavily involved must necessarily produce liberally in order to utilize the only means or hope of salvation. Overhead expense and interest would otherwise quickly bring about bankruptcy. Sharp curtailment of production by the minor producing group would fail in any event to bring about the desired end, hence the responsibility devolves upon the major group of independent and semi-independent producers. It is my experience that these men seek the views of their factors, listen intently to the summing up of the situation, but heed them not in actual practice. Inability to resist the temptation of available timber, necessity of cupping under leases already contracted for, pressure from timber owners who are in need of funds and must cash in their holdings, are some reasons which impel enlarged operations. The desire to be a "big operator" sometimes is the cause of better judgment being suppressed, while always the hope springs eternal that "maybe prices wont be so bad anyway." Agreements among the operators themselves have proven of no avail in the past and conditions in the naval stores industry do not lead to the belief that a coöperative movement along the lines followed in several of the fruit and vegetable industries could prove effective.

The salvation, so far as conservation of timber is concerned, lies in the operators themselves, who individually must study conditions and act intelligently. The factors will gladly aid and will supply such information as will assist their patrons in reaching wise conclusions, but the final decision as to the volume of production lies almost entirely in the hands of those who actually manufacture the goods.

DISCUSSION

Mr. Thomas Gamble, Editor of the Naval Stores Review, Savannah, Ga.: I know the industry and trade appreciate the great courtesy this Southern Forestry Congress has shown to it in assigning an entire day to the consideration of questions regarding the protection and needs of the naval stores industry. Those who have followed the history of naval stores know what a tremendous slump has come in receipts, until the last year, when there has been another forward movement. The forward movement in the production this year, those who have investigated this matter feel, has been to a great extent due to the utilization of the small timber that should not have been cut or boxed. In South Carolina, for instance, where nature has come to the rescue of the industry, and where for twenty-five or thirty or more years young timber has been growing prolifically, there has been a tremendous increase in production this year, perhaps forty or fifty stills being operated in that State where probably there were not eight or ten in operation a few years ago.

Men who have recently traversed a great deal of the new growth timber lands of South Carolina tell me that their hearts have been made sick by the destruction of the small trees in that section, trees that if left alone for a few years would have been enormously profitable as turpentine producers and would also have been valuable as lumber trees. The same doubtless holds true in Georgia, where there has been great boxing and cupping of new timber, as a result of which we have seen a large increase in receipts at Savannah and Brunswick. This has been especially noticeable in the production of pale rosins. In fact, the activity of Georgia in the production of pale rosins has been astounding, and to some extent has upset all calculations and done material damage, one might say, in holding down the market value of the upper grades. Mr. Pringle, in his paper, laid special stress, and very properly so, on this boxing and cutting of young trees. The Government has demonstrated conclusively that the working of immature trees is not only unwise but unprofitable to the operator, for the operator loses on every small tree on which he puts an axe or hangs a cup. I asked a factor in Savannah the other day, if this bad practice of cutting young trees was to continue, and he said that only a short time before one of his best operators was in the office, and he said to him, "Why are you operating these small trees? They are not sources of profit to you," but it was impossible to convince the operator that that was the case. "Why," he said, "I have leased this timber, it temporarily belongs to me, to work for three or four years, and I am going to work everything on the place," and it was utterly impossible to convince him that he wasn't even getting the cost of labor expended out of the small trees. Not only does the working of young trees destroy the future prospects of the producing timber that would be of great value, but by the increasing of the crop it serves to bring down and hold down the prices of the turpentine and rosin derived from the larger and more mature trees—so that it works two ways. The operator works such trees at a loss to himself, and at the same time by overproduction he reduces the value of the output from the trees that would be profitable. The Georgia crop this season is said to be increasing somewhere between 25 and 30 per cent, to a great extent due to the working of young trees that ought wisely have been left to a future time. The Government showed a year or so ago that there were in sight in the United States, out in the woods and at the ports, in the hands of the producers and otherwise, about one million two hundred and fifty thousand round barrels of rosin. This excess supply of rosin has been hanging over the United States market, as we all know, for several years, and the result has been the holding down of the market to a point that the production of rosin and turpentine has been unprofitable. This morning I asked three large operators whom I saw here what the conditions were in their section. They said there was a very bad feeling of depression as a result of the unsatisfactory rosin prices that are ruling this year.

Mr. Kayton has shown in his paper that this cannot be controlled by the factor, that the factor is not in a position where he can dictate any more, though he might have done so at one time,—to the operators as to what they shall do, and that the remedy lies entirely in the hands of the producers. The demand for naval stores has been more active during the past year. The foreign demand for turpentine is 50 per cent greater than a year ago, and practically the same for rosins, but while the outside world is taking so much more rosin and turpentine than it did during the previous season, it is not taking enough to take the increased production of 20 per cent, and to bring down the visible supply that was brought over, so that we have not benefited very much from the improvement in consumption, and if we go on another year and increase the crop, it looks as if it is perfectly hopeless to expect better prices from the operations of the naval stores industry.

Mr. C. F. Speh, Turpentine & Rosin Producers Association, New Orleans, La.: The factor and the banker—I say banker, because he furnishes the money—but the factor essentially, has it within his power to remedy the situation. It may not be that he can dictate to the producer and say, "You must only operate so many trees," but the producer needs a little outside education. The solution of this problem is going to be not so much in dictation as in education. If we can bring about a change through education we are going to have much more easy sailing than if we try to force it. So I think we have a perfect right, as producers in the industry, to look to the factor, the man who has always a common interest, to try the educational remedy,—to educate the producer that it is unprofitable to work these small trees. He can do that in several ways, by always telling them that it is to their advantage. He can always have it in his mind to point out to the producer that there is no sense in any business man operating an unprofitable enterprise. It is merely a question of dollars and cents, the foolishness of putting a hundred cents into something and getting back from it only seventy-five cents. We would not do it in the timber business, and we would not do it at anything else. Why, that's not the way we do any of these things. Furthermore, it is unfair, it is wrong for any man to take upon himself to withdraw from our wealth of one hundred years and destroy it just simply as a means of keeping himself in labor, when we know that he cannot possibly add thereby to his wealth. So I really believe I am going to pass the buck to the factor, that it is up to him to pass the education on to the producer. I believe you will get the more advanced operators to listen to you, and they might help you and take on themselves the work of educating the smaller producers.

Mr. A. K. Sessoms, Cogdell, Ga.: I know this, that a great destruction of small timber has been going on in the woods, but, as to how to best control that, my own views are that it is a matter of education. Now, whether the operator, or whether the factor can best educate him to do it, or go after the man that owns the land, I hardly know, but possibly all of them together could do something. In my opinion it is a question of education of the man owning the timber, or owning the land, to prohibit that gross destruction of his own resources, and that it is not profitable.

Mr. C. S. Hodges, Cyrene, Decatur County, Ga.: Out of thirty years experience in the yellow pine belt of Southwest Georgia, I have observed that necessity is a severe schoolmaster, but I have learned that the turpentine operator will learn in no other than the school of experience. In my own county, Decatur, which is right at the southwest point of Georgia, and in Douglas and Early and other counties in this section, the yellow pine has been the chief source of wealth. It has been heartrending to see the destruction of the yellow pine in southwest Georgia. It is surprising to me that the great Giver of all gifts has allowed the reproduction of that yellow pine harvest. It has been in spite of our efforts, for we have lent nothing to it. We have not protected the yellow pine from the forest fires. In our operations we have been guilty as a man who would pull up young corn. We have cut everything that you could stick a cup on. I thought one time,—and I am sure that we were correct—that when we got cups for the timber it would be a blessing, and I guess it was, but the trouble is that we have not profited by it, because we would stick a cup on a little tree that we could not get a box in. I heard a man say last year that thousands of those which were cupped were so small that it took two men to do the job,—one to hold the tree steady while the other put the cup on; and that is very nearly true.

The forest in our Southwest Georgia is fast reproducing itself. We have thought the turpentine operators were due no protection, for they use no common sense, you might say, but only greed for gain. We destroy the very thing that would in time be of value to the rising generation and to the State and to ourselves. I do not know how to conserve the forests, though I have made it a study for years. I have tried it in a small way on a few thousand acres of cut-over lands, and the reproduction of that forest has been phenomenal. I have ridden through the holdings of other men near me. I have watched the reproduction there and in the adjoining counties to me, and it is wonderful there, with nothing save what Nature has done. No effort or no man's hand has been turned to save the tree. We live in a country where the piney-woods rooter runs at large, and every turpentine man knows what that means when it comes to the destruction of new trees only a year or two old, and sometimes four and five. They will go down and get them and tear them out by the roots. The pine tree, as every one knows, is not like the sassafras or some other trees. If you break it up even with the ground it will not produce itself any more, and therefore, the destruction alone of the piney-woods rooter has been more than we can calculate, but it has not been as much or as extensive as the destruction of us operators, I am sorry to say.

The question of taxation was brought up in Mr. Pringle's paper. I believe that the tax on cut-over lands in the territory that I live in, and in several counties like mine, will not amount to more than 20 cents per acre. I think that is low. Six or seven dollars per acre is the valuation. In Mr. Pringle's country the millage is thirty-five or forty, and I believe that will amount to more than 20 cents per acre. That condition itself will prevent conservation and discourage men to reproduce forests, because the lands there are not so very valuable, other than the pine trees that grow on them. It is poor land, and the good Lord has given us one thing that will grow on poor land, and that is yellow pine. How we can do this, how we can bring about a system of thinking and education among our people with reference to the burden of taxation, I don't know, but I do know that it takes from 15 to 20 years for a forest to reproduce itself to where you can saw mill it again, and that is only where it has not been sawn over too close. There is a saw mill in our county now that will cut timber down to where it is only eight or nine inches, right at the ground too. Now, it will take that forest forty years to reproduce itself. Where it is cut to 10 and 12 inches, and the trees left, it can be worked and turpentined, if it is worked conservatively, in 15 years. Pardon me for taking so much time, but I want to say one thing. A few years ago I went to an old farmer to lease his timber. He said, "How small are you going to cut it?" I said, "Well, we are not going to cut it below eight or nine inches." He said, "You cannot cut my timber that low." That old man got me to thinking. I finally traded with him on the basis of cutting his timber down to 10 inches. I thought somebody had been talking to him and he would not bother about watching the woods, but that old creature was out there the day we started. He ran the negroes out of the woods. He would not let me cut it under ten inches. I said, "We can't measure every tree." He said, "You will have to do some good guessing, then. You can't cut my timber under ten inches." Mr. President, I made more money on that than I ever made on a lease proposition in my life, because I got results from the trees that I did work.

On the other hand I can show you thousands of these little trees worked elsewhere. Let turpentine go to one dollar and a half and two dollars, and every turpentine man will lease anything he can lay his hands on, that he can put a cup on, and I can show you trees where they were worked four years, and they are broken off where they cut them. Now, that is a destruction that the factor cannot control, and gentlemen, we cannot expect anybody else to control it, except the man that is operating it. Turpentining has been too easy,—it has been too easy to make a living. Now, that is a fact. We all know it. A fellow can get a nice check-book in his hip pocket and get in his automobile and ride around and have a good time, and get incompetent men to look after it, just so that he breaks even in the fall, and is able to borrow money from some bank or some factor. But we haven't paid any attention whatever to the very thing from which we have been deriving a livelihood. We have paid no attention whatever. Let it go, let it go. If I had what has been burned up in the territory where I am working,—I wont go any further than that,—if I had what has been burned up down there, I would have more than we can work out of the live trees.

Mr. A. V. Wood, Vice-President Georgia Forestry Association, Brunswick, Ga.: I am one of those young men like Mr. Kayton, who has only had a few years in the business. I began sometime in 1868. I have watched the turpentine business in a way during those years, and have followed the flag, you might say, only at Brunswick instead of Savannah, for forty-eight years. I am thoroughly in accord with the ideas and the remarks of these gentlemen on the question of education. It is a matter of education entirely, as to what we could do. I thought we could educate our legislators in the first place to the enormous possibilities that they have of correcting some of the evils we have been confronted with. How we are going to do that I do not know. I was in the Legislature but once in my life, and then I quit. I tried to get a bill passed in the Legislature some years ago to establish a State Board of Health,—and of course it has been established since.

Education of the operators is coming gradually. As Mr. Kayton said we have a great many more intelligent operators in the forests now than we have ever had before. Conservation is growing there, but it has not grown to the extent that it should grow. To many of us it sometimes appears as if it were almost stagnant. I don't know very much about the naval stores business, but I am an observer, and one of the great things that is being done now and has been done for the last few years has been the educational work by Mr. Austin Cary. Those of us who have been in the business see the revelations of this man working all the time. The operator in the country is seeing it, those that he comes in touch with all the time. Many of them are profiting by his researches and the experiments that he is making, and certainly that is going to be one of the big results, the conservation of the timber already standing. It is already showing results.

I went into the business, as I say, in 1868. In 1871 the senior member of the concern that I was working with came to me very dolefully, I suppose we had had a bad year,—and said, "The naval stores business will last about five years more." It was very doleful to me, a young man, only to have five years lease of life in that particular business. However, it jogged along. I traveled on down to Brunswick, and after I had been there about ten years, one of the members of our firm came in one afternoon, called me in his office, and said, "Woods, what are you going to do?" He felt as if the industry was going to stop. He said, "I will give it about ten years." So I really have become an extreme optimist. I don't believe there is any stopping point in the naval stores industry. I am certain that there wont be any lessening of naval stores production if an organization like this, and people like we have in this organization, keep themselves thoroughly alive to the situation and push it forward as it should be pushed.

Mr. A. S. Carr, President A. S. Carr Co., Bainbridge, Ga.: I am in line with Mr. Pringle's views, and Mr. Seph, about the production from the small tree, the small immature pine tree, so many of which are being operated in our country. I suppose at least 15 to 20 per cent of the total production is produced from immature trees that do not produce any profit. The life of that tree is destroyed, preventing future growth that would make it good for lumber. In working these small trees we do not produce any profit, but destroy wealth and make an overproduction of turpentine. I have always been in favor of letting the small tree grow until more mature when we can make a profit out of it. I have kept an account of the costs and I know for a fact that you put more money into a small tree than you get out of it.

Mr. Gamble: When the cup system came in I remember talking with Mr. Shotter, who certainly was one of the ablest who ever handled naval stores. He had been carefully looking into the cup system, and he said it would bring about two things,—bring about overproduction and bring down the price of the pale grades to a point where they and the low grades would be on a level; and Mr. Shotter's prediction has very well been demonstrated. He saw that the cup would enable them to work smaller trees, and that the industry would be guilty of all sorts of overproduction.

Mr. J. G. Pace, President, Pace Lumber Co., Pensacola, Fla.: I have belonged to this Southern Forestry Congress for a number of years. I was with it last year in Montgomery. In regard to naval stores, I am glad to see these turpentine people connected with it. We have been turpentining for thirty years like Mr. Hodges said. I went through Southwest Georgia about thirty years ago, out by Cordele, Americus and Abbeville, and I told my wife when I left Pensacola yesterday that I was going to come through Georgia in day-light. I came to Montgomery Saturday morning, and got on the train,—came by the Seaboard all the way through. Thirty years ago it was a beautiful country with timber on it. Today in all those vast acres there is nothing left but denuded land, land not fit for farming or making anything, nothing but stumps left on that land. Well, sir, I was never more surprised, to see the land between Americus and Cordele and over here at these rivers, cleared up down to the branches. They are turpentining right along in these spaces, cutting right in the little small spaces that were left. There is a growth of timber there large enough for turpentining, and a gentleman I was talking with last night on the train said they were getting 48 to 55 gallons of turpentine per acre. That beats Florida.

Now, whether we take the command and go forward or not, I do say this, that the man who owned timber, and stood still, has got more than the man who has gone forward in the effort for gain. That is my experience. To illustrate that, I am going to tell you a little coincidence in my own business. A young man once came to me, about the time I lived in Georgia, about 22 or 23 years ago, and said, "Mr. Pace, I want to borrow $150 to buy a piece of land." I said, "Is there anything on it?" He said, "Nothing but a second growth of timber." This was 22 years ago. I loaned him $150, and he bought something like 450 acres of land. Now, these turpentine people had already turpentined a small amount of adjoining timber. I said, "Now Mills, these turpentine people will be nosing up by you before long,—just hold your timber." He did. And six or eight years later he sold that timber to the turpentine people for $1500. He kept his land and had a pretty fair growth of small timber.

Reforestation is no individual or no corporation concern. It is a community interest. No one individual, no one corporation, no several corporations can do it alone.

Taxes at 20 cents per acre, while you have got a young growth of timber on it, seems to me pretty high. It is discouraging for a man to try to hold a tract of land to reforest with the high rate of taxation you have to pay. However, I believe I had just as soon have money invested in cut over pine land as to have it put in anything else, even at 20 cents per acre, when I consider the number of trees growing on the land.

The lease system is bad. A turpentine man takes a short lease. Labor is scarce and hard to manage. He will do anything to try to cut it all before his three year lease expires. That is a bad system, but most of us work that way.

Mr. Thomas Gamble: Just as a little interlude between hearing from the operators, I am going to introduce a resolution to bring the matter right before the meeting. All of you know that the Government is doing a good deal for the turpentine industry. Ever since Dr. Herty began his investigation which opened up interest in the naval stores industry, more and more attention is given to it by the National Government and in various operations throughout the South, but we all realize that the Government is not doing as much as it should do, that these investigations are hampered very much by the absence of adequate appropriations. In the matter of uses of naval stores, for instance, the Government could do a great deal of work toward broadening the uses of rosin and turpentine and in finding out what they can be used for. A gentleman came to my office a week or ten days ago. He is one of the largest buyers of rosin in the world. His concern handles one hundred to two hundred thousand round barrels of rosin,—quite a batch of stuff for one concern. He told me the Eastman Kodak Co. was importing three to five thousand barrels of French rosin every year because they couldn't get sufficiently fine rosins in the United States. I do not vouch for that statement, I am giving it to you as given to me. He says we don't make the fine rosins for the needs of that concern, and they had gotten a French rosin, which they call AAAA, a grade about four or five grades lighter than our best water white rosin. There may be others in this country who would use a No. 4A grade if it was called to their attention. It might be this quality of rosins could be enormously developed in this country. These are the things that the Government could and ought to do for us in the rosin and turpentine and various other trades. Now, to bring that before the meeting, the following resolution has been prepared:

*TO URGE CONGRESS TO MAKE PROPER APPROPRIATIONS FOR RESEARCH TO AID THE NAVAL STORES INDUSTRY

WHEREAS, The Naval Stores industry of the United States, including the States of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas, in its production of spirits turpentine and rosin and allied products represent a gross aggregate value of fifty million dollars annually, of which approximately one-half, or twenty-five million dollars, is exported to foreign countries yearly, and

WHEREAS, This industry furnishes constant employment to many thousands of men and represents an invested working capital of many millions of dollars, and is a source of prosperity to large sections of the Southern States referred to, and a large element in the freights of railroads and steamship lines, and

---

* This resolution is here given in its amended form as finally adopted by the Congress.

WHEREAS, These naval stores products are essential elements in the manufacture of many commodities used in domestic consumption and extensively exported, and thereby assist materially in the employment of many thousands in manufactories located in other sections of our country, and

WHEREAS, The perpetuation of this naval stores industry and its profitable operation depend upon reforestration and the establishment of improved methods of production, and

WHEREAS, The Federal Government in recent years has undertaken investigations and furnished valuable coöperative assistance in efforts to promote the industry, but has permitted such vitally important cooperative work to be seriously hampered by inadequate funds, thereby preventing the industry from deriving the full benefits that should accrue from governmental coöperation of this character; therefore, be it

RESOLVED, By the Southern Forestry Congress, assembled at Savannah, Georgia, in its Sixth Annual Congress, and on a day devoted entirely to the naval stores industry, that a committee of seven representing the several sections of the naval stores belt, and including representatives of the naval stores sections of the Savannah Board of Trade, Jacksonville Chamber of Commerce and Pensacola Chamber of Commerce, be appointed by the President of the Congress to memoralize the United States Congress and communicate directly with the Senators and Representatives from the naval stores states, urging larger and continued appropriations for the naval stores industry, and that in particular appropriations be made for research work looking to new and broadened uses for spirits turpentine, rosins and allied products, and for field and laboratory work that will promote the practical industry and encourage and establish reforestation as the means of its perpetual continuance, such Committee in its memorial to present facts and arguments and elaborate on the work the Government can satisfactorily and effectively do in this connection.

Dr. F. P. Veitch, U. S. Department of Agriculture, Washington, D. C.: I think it is needless to say that we are deeply interested in your industry, and that the Department of Agriculture has the greatest desire to be of all possible help to you in making it a success, not only for the present, but for the future years. Perhaps I should give you a brief outline of what we in the Bureau of Chemistry are trying to do. I think it is of the greatest importance and greatest service to you, a work that ought to be done, and that work we are trying to supply or carry on further both at the still and in the uses of your products. Now, our work is divided in general into three main lines,—that of domestic research work and the enforcement of the recently enacted Naval Stores Act. The purpose of our domestic work is at the individual places to carry to the individual operator and his force the best methods known to the Department of Agriculture, to develop by the Forest Service, wherever we can supply that work, our own rule and the best methods known to the industry itself. Wherever we see a good thing in the hands of an operator we steal it from him and give it to the rest of them. That is what we want to do. He has no objection there. Bear that in mind. He is perfectly willing that the good thing that he finds out may be passed on for the use of the whole industry. So we are trying, among other things, to stop these tremendous losses that occur after the gum is drawn from the tree. It has been very clearly brought out here this morning, and should have been known a long time, that the larger that loss the less we got from a diminished or small tree. It has been shown that this is the least productive. I am perfectly convinced that we are losing money also on all the larger trees because of the wasteful processes that are so generally used through a large section of the industry. I am frank to say that at least ten per cent will be a low estimate of the increased value that you could get from a thorough careful control and saving of the wastes that now occur in the industry, and that increased return is profit, because you have already had all your expenses.

In this demonstration work which we have been doing ever since we have had operation of naval stores the government has been fortunate in securing the services of a man who knew naval stores from a to z. This man at present is located here in Savannah. He is at your service, to visit your places and help you in every way that it is possible, to point out where he thinks you can improve your outturn and receipts and make more money. He is here for you to call on at any time, either here or at your places, and I hope that a large number of you will do this. We want to extend that work and make it more useful to you, as funds are available. We are seriously handicapped this year in that work, and I am a little fearful that we will have difficulty in raising funds to assist you in the field as we would like to do during the present year, but we are making our best efforts to get funds from our present resources.

Now, in addition to that, we are doing constantly a great amount of research work, looking to a better production, the reasons why we are getting lower grade articles, the reasons why these products give trouble in certain uses, and also to extend the uses of these various products. This all takes money, and we haven't enough money to do this as thoroughly and as vigorously as we would like. It is surprising to find how many problems come up from the users of turpentine and rosin, things that they have used for years and years, and yet every once in a while there is a little unexplained difficulty that they have with it. And they are presenting these things to us, and we cannot always tell them the answer. First, perhaps, it is a maker of dentists' supplies, and then again a maker of varnish, and so it goes. Another time it is a maker of a turpentine drum. What is the trouble? What is the difficulty here that we are encountering? And we are trying to solve these problems,—difficulties, to extend the uses and explain flaws in the old uses, why these things have turned up, and to try to eliminate the difficulties that are coming about in some cases with these well known useful materials.

Mr. Gamble and other speakers have referred to the use of rosin in place of fossil gums. You know that the varnish enterprise has been able to use fossil gums. It is only comparatively recently that good varnishes have been made from rosin. Now, we can extend the market for rosin by determining what are the characteristics that are required for a first-class varnish, and try to give rosin those characteristics. I am sure that it can be done, it is the coming thing, and it can be done. One of the things that has been very dear to my heart for many years and one of the things that as soon as we are in funds I want to inaugurate is the combination of demonstration and research work. I want to see the Government have at some centralized, easily accessible locality, where local conditions are right,—a first-class demonstration still, in order to show the best methods for production and in the uses of turpentine and rosin. The Bureau of Chemistry is prepared now to introduce some, I think, decided improvements along that line, and to coöperate with the Forest Service and other governmental agencies, and with the turpentine operators and producers, in the full exploitation and running of such a still, a place where every item of the turpentine production can be clearly visualized and fully understood, from acquaintance in the very beginning, and from the very production in the beginning of the tree to the final making of the product. I hope we will be able to do that at an early date, but it is all going to depend on the funds to do it with. It will probably take $15,000 to even establish such an institution and $5,000 more to run it.

Now, I want to say a few words in conclusion about the enforcement of the Naval Stores Act. That work has been assigned to the Bureau of Chemistry. No appropriation has so far been made for carrying it out, but estimates have been made and we will soon be actively engaged in enforcing that work. You know what we have done in the way of providing rosin standards and that these have been adopted by an Act and made Federal grades. Our regulations under the Act are now in the hands of the printer, to be available to you in a short time. I am confident that we will be able to make you some money by a vigorous enforcement of this act. We are going to decrease the supply of so-called turpentine I think very materially, and increase the price of turpentine, because there is a lot of adulterated stuff that is being sold in this country, and it is being sold generally where it is very, very difficult to reach. That is, it is sold to you and me over the counter of the small store, especially the country store where we have got no opportunity of finding out the source, whether it is pure turpentine or heavily adulterated turpentine, and the law is going to enable us to get at that, and I think very much good will result to the producing industry, to the dealing industry, and to the final user of the turpentine who pays the bill, that is, the householder.

Mr. O. H. L. Wernicke, Pensacola Tar & Turpentine Co., Gull Point, Fla.: I have been quite close to the Southern turpentine and rosin producers for thirty years, and am somewhat posted as to your local conditions and your viewpoint; I have also been a consumer of those products to a greater or less extent. Dr. Veitch has told us about the work the Government is doing and also mentioned the Naval Stores bill. I hope the naval stores business will get some benefit from the bill. We will take turpentine as an example, where it is used for a thinner or dryer, if we were dependent on turpentine alone we would have to close up most of our finishing materials industry, because there is not enough turpentine to go around. We only make about 500,000 barrels of turpentine and much of it is exported, other thinners and dryers are extensively used and this must be so regardless of sentiment. It has not been popular to talk of mixing turpentine with other dryers. Petroleum spirits are acceptable to the trade and if naval stores people would encourage the use of turpentine and petroleum compounds, it would surely increase the popularity of turpentine and extend its use, and probably stabilize the price. I have no quarrel with the United States in regulating things, if we put 25 barrels of turpentine and 25 barrels of petroleum spirits together making a product that is useful to somebody else, we should be willing to label it properly so there could be no deception, but the present bill prohibits the use of the word turpentine in combination with any other chemical, whether the result is good, bad or indifferent, and the results of it is that wood turpentines have declined and have to be sold at a heavy sacrifice since that bill was enacted. Those are the facts, gentlemen, and they do not help the general turpentine situation. The purpose of the bill is all right but its effect is not what was anticipated; its administration will be a very difficult matter. I do not believe men like Dr. Veitch who are charged with the administrative features of the bill would knowingly do a harmful thing, but they can not know all the conditions that we have to face in this industry.

There can be no overproduction of turpentine except as a result of under-consumption. Turpentine is a small part of the total of paint varnish material, particularly in the line of solvents and dryers. There is nobody in this hall who can tell why turpentine rather than petroleum or coal tar dryers and thinners should be used. They are all good solvents. Of course turpentine is used and generally preferred but there is no use deluding ourselves. If a varnish manufacturer can get along with ninety per cent of other solvents and dryers he can use them altogether, that is nobody's fault, but it is a fact that we have got to face. If we dry up every source of turpentine in the United States, it will not stop the making of finishing materials. The makers of automobiles, vehicles, and part of our railroad cars use no turpentine. Ford doesn't use turpentine. Studebaker, who used to buy it to finish his wagons does not use turpentine, they all go right on making more vehicles and cars than ever and are getting along without turpentine. But there are other uses for turpentine that have not been developed and it is part of the work of Dr. Veitch and his department to discover in what form it can best be used.

There is another great waste going on in our commercial activities with reference to color. If a man makes black or brown varnish, why in the world does he need water white turpentine? Be it government standard or any other standard, what does he want with water white turpentine?

You may depend on the technical industries to call for the kind of color that suits their particular product, there is no use in suggesting to them that everything must be water white. The color adds nothing to the quality.

The United States government specifies water white turpentine to paint the bottom of a ship and it must distill 90 per cent off at 170°C. What has that got to do with the bottom of a ship? Absolutely nothing whatever, except to retard the use of turpentine.

I think the turpentine producers ought to get together and make some experiments of their own; they could employ men like Mr. Pace and Mr. Hodges who spoke to us, and send them to Washington with Dr. Veitch to work out these problems from a practical point of view. They could say to him, "We have 50,000 barrels of excess turpentine, and as many barrels of rosin that we must get rid of and we want you to tell us in what form we can sell it to somebody." We must broaden our consumption rather than restrict our production.

Mr. Gamble: Why did Studebaker quit using turpentine?

Mr. Wernicke: Studebaker found that if everybody used turpentine they could get it only thirty days in the year, and the rest of the time would have to use something else. So when they found that they couldn't get turpentine all the time, they sought and found a substitute. There was a time when the sleeping car people used turpentine. There was a time when the railroads were large users of turpentine. That was before the days of development of petroleum spirits in varnish and paint mixing. The amount of thinning material then used was relatively small, and turpentine was relatively cheap. It was economical to use.

Take lime, everybody thought it was a simple product since the time of King Tut until the lime association was organized and took a fellowship in the Mellon Institute of the University of Pittsburg. Speaking of lime, I want to tell you that we are finding it possible now to use rosin in varnish and paint because we learned something new about lime in connection with it. Not so long ago rosin varnish was unpopular but now the very best grades require the use of rosin. We did not know how to use Chinese wood oil, but we discovered that by using a lime combination we could dispense with linseed oil. We now make a fair varnish from cheap materials, which it was thought could only be produced from genuine linseed oil, costly gums and pure turpentine.

At one time we thought if we bought a hundred million dollars worth of automobiles it would bankrupt this country. I heard a wise banker say so. At this time we are spending for automobiles and accessories something like four or five billion dollars a year and we have just recently spent thirty billion dollars on the World War and it hasn't killed us. We have more automobiles now than we had before the war and we are buying them now at a greater rate than ever before. I mention that to show that it is an artificially developed industry. There is no normal demand; nobody had ever thought they needed such a thing as an automobile. They didn't even know that they wanted them until they had been demonstrated and advertised. In earlier days the horse and the wagon carried our produce to market, but today we couldn't keep house without autos and radio. All you have to do is to make more people want naval stores, rosin and turpentine in the particular branches where its use will answer the purpose a little better than something else, and it need not be cheap.

The big soap people buy your rosin at about two cents per pound, but you buy their soap at 25c per bar. What are the rosin producers doing to protect conditions in that field? Absolutely nothing in an organized way. It would not be difficult to expand the uses of rosin so that instead of there being a surplus there would be a demand for more.

Mr. J. E. Lockwood, Hercules Powder Company, Wilmington, Del.: I am very much impressed with what has been said today. I believe in the economical utilization of the pine trees, and the talks we have had today regarding the conservation of the pine trees or forests in this country. I believe the economy should also include the utilization of the stumps and the dead wood, so that as a man produces timber it will be fully utilized, and then reforestry reaches the circle of repeating. We are seeking at all times in what ways we find possible and what suggestion we get from others, to find out how we can better produce naval stores or find possible uses for them; and one thing that has rather impressed me forcibly today is this,—that so much has been said of one dollar being invested in a part of the operation where only seventy-five cents is returned. It occurs to me that if we would take the money that has heretofore been invested where it did not produce the logical and proper result, and invest that in finding and developing the possible and proper uses of naval stores, we would be doing more to conserve our resources and to develop possible profit from them than we can in many other ways. I believe, as Mr. Wernicke said, that much can be done that would open up the possibility of larger consumption, and we would be very glad if every one of those interested in the naval stores industry were to get together and exchange views. We would be very glad to bring up various things that we believe might possibly lead to a larger demand, possibly to recovering markets and uses which have been lost. If we can all get together, not relying on the Federal government, but taking hold ourselves, doing what we can, investing our money in a logical profitable way, we will get the promised result.

I would like to add as one concrete fact which was recently brought to my attention, namely that the slogan, "Save the surface and you save all," with the entire paint and varnish industry in this country behind it, has doubled and trebled the paint and varnish business in this country at a cost to everybody of less than one per cent. Compare that to investing one dollar and only getting back 75 cents for it. I believe in combination, it holds a great deal of promise.

If further meetings are held of people interested in naval stores, when they get ready to exchange views and get the common combined experiences of the business, we would be very glad to come with you, because we are trying to advance and double our profits in the naval stores industry.

Mr. J. S. Holmes, State Forester, Chapel Hill, N. C.: In seconding those resolutions may I say just a word in regard to them. I come from a State where the children in the schools have for the past 100 years been taught that some of the leading products are tar, pitch and turpentine. Of course we have had no appreciable amount of these for many years, but the fiction is still perpetuated. I have been tremendously interested in the vital talks this morning, and I realize that perhaps what you gentlemen say is correct. But I realize, and want it expressed in the resolution, that the end of this business is in sight unless something is done to perpetuate it. We have destroyed the industry in North Carolina, and our meeting here today was particularly for the purpose of seeing if something cannot be done. I believe our purpose is to try and perpetuate this industry. I have noticed that most of the discussion has dealt with increasing the output, increasing the markets and uses of turpentine, but very little has been said about perpetuating the supply. I would suggest that something be added to that resolution, asking the Government to investigate methods whereby the land-owners and the operators themselves can help perpetuate the supply. I think it is very important that we who are all interested in the Naval Stores industry should also emphasize that side of the problem in these resolutions.

Mr. Gamble: Are you offering that as an amendment?

Mr. Holmes: Yes, I would like to see it amended in that way.

Member: Would it not be wise to refer these resolutions, pending further development of the purposes of this meeting, to the Resolutions Committee?

Mr. Gamble: Except for this reason, that this is peculiarly the naval stores day, and the rest of the days, after half an hour or so, will be too taken up with other matters, and there will be no opportunity to get to this again.

The President: Mr. Gamble, if you will allow me, would it not be well to get an expression of opinion while we are all here on the gist of the resolution, and then the Resolutions Committee can incorporate that in their report after they have perfected it?

Mr. Gamble: It goes to the Committee of Seven to prepare an amendment.

The President: Does anybody desire the resolution read again before presenting it for action? The resolution is now before the body. Those in favor will say aye, those opposed no.

The ayes have it, and the resolution is adopted. The President will appoint a committee of seven as provided for in the resolution.

Dr. Austin Cary, U. S. Forest Service, Washington, D. C.: Mr. Wernicke has shot into this meeting some ideas of a very wholesome and important character, and I want to acknowledge that, and emphasize their importance. One is in regard to the turpentine enterprise in the South, that all Naval Stores interests ought to get together. He also stated yesterday that the turpentine industry is an enterprise that has just begun, and with a possibility of markets for its products that we do not yet realize. That is startling, because men have been thinking of this industry as a failing one.

In compliance with the resolution calling for the appointment of a Special Naval Stores Committee of Seven the President appointed the following:

SPECIAL NAVAL STORES COMMITTEE OF SEVEN

Mr. J. C. Nash, Chairman	Savannah, Ga.
Mr. A. V. Wood	Brunswick, Ga.
Mr. J. G. Pace	Pensacola, Fla.
Mr. J. W. LeMaistre	Lockhart, Ala.
Mr. L. V. Pringle	New Orleans, La.
Mr. E. C. Gay	Biloxi, Miss.
Mr. Harry Wilson	Jacksonville, Fla.

The President also appointed the following Committees:

COMMITTEE ON RESOLUTIONS

Mr. E. O. Siecke, Chairman	Texas
Mr. C. B. Harman	Georgia
Mr. A. B. Hastings	Virginia
Mr. George Wrigley	South Carolina
Mr. E. C. Gay	Mississippi
Mr. W. L. Barnett	Florida
Mr. E. H. Frothingham	North Carolina
Mr. Phillip D. Houston	Tennesee
Mr. A. A. Benson	Alabama

COMMITTEE ON SELECTION OF NEXT PLACE OF MEETING

Mr. H. L. Kayton, Chairman	Savannah
Mr. J. S. Holmes	North Carolina
Mr. P. R. Camp	Virginia
Mr. C. F. Speh	Louisiana
Prof. T. D. Burleigh	Georgia
Mr. J. H. L. Henly	Alabama
Mr. E. R. McKee	Florida
Dr. A. C. Moore	South Carolina

COMMITTEE ON NOMINATIONS

Mr. W. D. Tyler, Chairman	Virginia
Mrs. M. E. Judd	Georgia
Major J. G. Lee	Louisiana
Mr. O. M. Butler	Washington, D. C.
Mr. J. R. Weston	Mississippi
Mr. W. E. White	Florida
Mrs. Julia Lester Dillon	South Carolina

DEATH

of

M. L. ALEXANDER

Marcus Lafayette Alexander was Commissioner of Conservation of the State of Louisiana from January 1912 to the day of his death on March 18, 1923. He was born in Mecklenburg County, Va., and died in New Orleans, La., at the age of 58 years.

By motion of the Congress the following resolution is to occupy a page of these proceedings:

RESOLUTION

WHEREAS, this Congress has lost since its last session, by the death of Colonel M. L. Alexander, one of its most useful, active, and lovable members, one who has left his indelible imprint on the forestry work of not only Louisiana but the entire Nation, therefore

BE IT RESOLVED, that this Congress hereby expresses its great sorrow at the irreparable loss which it has sustained.

REPORT OF LEGISLATIVE COMMITTEE.

The chief function of a Legislative Committee of this Congress, as I see it, is to act as a clearing house for information on National and State forestry legislation for the use of all states in our group, especially, but by no means solely, for the states where state action looking toward systematic forestry practice is contemplated. Such a Committee to be of use to the Congress must have help from interested and informed men in each state and from the Forest Service. I wish to suggest that the Committee for the Seventh Congress be organized immediately after this session and to urge that each member of the Congress who is in touch with legislative matters in his state, keep the new Chairman informed. Such information can be sent direct or through the Secretary, and can be used effectively when a call comes to any officer of the Congress.

It is easy to get the impression that in the case of the States now organized for forestry work, the several legislative measures are all worked out and are operating adequately. This is far from true and it is becoming increasingly important for individual and concerted action to be taken looking toward more adequate forestry practice in the States where forestry departments have longest been established.

No attempt will be made in this brief report to describe the legislative situations in the various states. It will be of interest, however, once more to call the roll,—Maryland, West Virginia, Virginia, North Carolina, Tennessee, Louisiana and Texas have forestry departments which are holding their own and gaining ground each year, with Alabama now added to the fold. Kentucky, South Carolina, Florida, Georgia, Mississippi, Arkansas, Oklahoma and Missouri are yet to take up forestry as a State activity, although legislation is now pending, or soon will be, in most of these States.

The experience of Mississippi and other States has taught the lesson that initial forestry legislation should be simple and direct, providing for:

(1) A non-political Commission with representation from vitally interested groups;
(2) A technically trained and experienced forester;
(3) The investigation of existing conditions;

(4) The education in the protection and development for continuous use of the forest resources;
(5) The control of fire;
(6) Such equitable taxation as will relieve growing timber from the unequal burden of the general property tax. (This is not, in fact, and should not be called, tax exemption.)

It will sometimes be neither possible, nor advisable, to incorporate tax legislation into the forestry bill. Doubtless in the future, as in the past, it will in some states be necessary to make a start with a law which provides no tax relief. It seems certain, however, that little real progress can be made in reforestation if the general property tax can be levied each year upon the full value of young growth.

Alabama has enacted, during the past year, a remarkably comprehensive law as its initial legislation. It should be borne in mind, however, that Alabama already had a source of revenue from occupational, license, or privilege taxes imposed for engaging in business dealing with timber, without which a less complete program only might have been possible. This same advantage is available to some other states and might point the way to a start in such states.

In the States which impose a severance license tax on the cutting of timber or privilege license taxes on businesses dealing with timber or other forest products, it is urged that all of the funds thus collected be set aside in a special State Forestry Fund to be devoted to the protection and development of the forest resources of these States.

In closing, it is desired to urge as essential that the simple, direct legislation for the establishment of a department, be backed with sufficiently adequate financial and moral support from the start, so that the few things atempted can be thoroughly and well done, first for their own sakes, and secondly, in order that the new department may have a fair chance to gain the confidence of the citizens, through which alone, healthy expansion in the future can be assured.

A. B. HASTINGS,
Assistant State Forester of Virginia.

REPORT OF THE COMMITTEE ON RESOLUTIONS

The following resolutions were recommended by the Committee and after some discussion were adopted by the Congress. Resolutions on the Naval Stores Industry and on the death of M. L. Alexander will be found elsewhere in these proceedings.

1. THE CLARKE-MCNARY BILL

Whereas, a Select Committee on Reforestation of the United States Senate has, during the past year, toured the country, visited practically all of our large forest regions, held hearings at a number of points, and submitted a report on the forest situation in the country; and

Whereas, the Chairman of this Committee, Senator McNary, has introduced a bill in the United States Senate, and Representative Clarke, of New York, has introduced a companion bill in the United States House of Representatives, which include the recommendations of that Committee concerning cooperation with the States and the acquisiton of lands for National Forests;

Be It Resolved: that the Southern Forestry Congress urges the passage of these bills, and

Be It Further Resolved, that a copy of this resolution be sent to the President of the United States and to the members of the Congressional Committees to which these bills were referred.

2. FOREST EXPERIMENT STATIONS

Whereas, we recognize that the safety of investments in forest raising cannot be assured without definite, detailed, and reliable information upon all phases, and that this can be satisfactorily secured only as a result of systematic forest investigations such as are being carried on in the coastal pine region by the Southern Forest Experiment Station, in the Appalachian hardwood region by the Appalachian Forest Experiment Station, and generally by the Forest Products Laboratory;

And Be It Resolved, that we urge upon the Federal and State legislators and upon educational institutions, associations and forest landowners in the States concerned the necessity of enlarged facilities for forest investigations, particularly by increased funds and cooperative participation in the work of the two Stations and of the Laboratory.

And Be It Further Resolved, that copies of this resolution be brought to the attention of Federal and State Senators and Congressmen of the Southern States.

3. A STATE FOREST POLICY

Whereas, the Southern States contain more than one-third of the idle forest lands of the United States, which now constitute a grave state and national menace, but which can be converted into one of the greatest assets of the South through the adoption of a practical state forestry policy.

Therefore, Be It Resolved, that the Southern Forestry Congress assembled in its Sixth Annual Meeting in Savannah, Ga., urges the Southern States immediately to adopt a state forest policy to include in the main:

(1) A non-political State Board of Forestry or Commismission representing the forest, agricultural, stock-raising, and other interests which may be chiefly concerned, to supervise the development of state forestry work under the immediate direction of a trained and competent forester.

(2) The establishing of a Forest Fire Protection System.

(3) Provisions for encouraging and inducing private participation in reforestration through coöperation with public agencies and by modification or readjustment of the existing system of taxing forest property, or lands devoted to reforestation; and

(4) Provisions for properly financing the state's forestry department and work.

And Be It Further Resolved, that, in the opinion of the Southern Forestry Congress, the forestry law enacted in 1923 by the State of Alabama, embodies, to a great degree, the essentials above enumerated and that therefore, this Congress urges the Southern States now without proper forestry laws, carefully to consider the Alabama law as a basis for forestry legislation.

4. THE AMERICAN FORESTRY ASSOCIATION

Recognizing that vigorous and widespread education is essential to the progress of forestry both locally and nationally, and that there is great need for a continuous campaign of education throughout all sections of the United States, to the end that a proper appreciation of our forests may be instilled into every man, woman, and child in this country; and recognizing that the American Forestry Association, through its monthly magazine, *American Forestry and Forest Life,* and through its other faclities for disseminating information, is carrying to the people in every State in the Union accurate, interesting, and informative material regarding our forests, their uses and their needs, and is thereby molding a sound and constructive public sentiment in behalf of State and National forestry, and that the Association is an agency by which concerted action can be taken in behalf of public forest measures throughout the country, the Southern Forestry Congress herewith commends and endorses the work of the American Forestry Association and pledges the support of the Congress to the objects and activities of this Association, and it urges its members to support the association by becoming active members and by aiding in increasing the membership of the Association and the distribution of its magazine.

5. THE McNARY-SMITH BILL

Whereas, the Southern Forestry Congress, while primarily engaged in the promotion of forestry, affirms that there is no conflict, as regards forestry progress and agricultural progress, and that consistent and proper development of such cutover lands as are agricultural in character constitutes sound public policy.

Therefore, Be It Resolved, that this Congress endorses the principles of the McNary-Smith Bill, the purpose of which is to stimulate the development of agricultural land now in an unproductive state.

6. COMMITTEE ON FEDERAL LEGISLATION

Whereas, we, the Southern Forestry Association in congress assembled, feel that a real crisis has arrived in the development of a National Forestry Program, and that it is now the time to act, *Therefore, Be It Resolved,* that the President of this Congress be and is hereby empowered to appoint a suitable committee to meet at Washington, D. C., and appear before the proper authorities with a view to hastening in every possible way the enactment of constructive and progressive forestry legislation.

7. ELEMENTARY INSTRUCTION IN FORESTRY

Be It Resolved, that the Southern Forestry Congress hereby urges that elementary instruction in forestry be given in all graded schools, universities, agricultural colleges, and normal schools in the Southern States, and recommends that the Southern Forestry Congress prepare brief statements concerning the forestry situation for distribution to civic organizations, federated clubs, and all other agencies that should be interested in forestry progress.

8. FEDERAL ACQUISITION OF SOUTHERN LANDS

Whereas, the timber resources of the Nation are rapidly disappearing, and

Whereas, the forest land in the Southern States comprises one of the best and most rapid growing timber regions in the United States, therefore,

Be It Resolved, that it is the sense of this Congress that a bill should be passed by the National Congress authorizing and directing the Forest Department of the Government to purchase suitable cut-over lands in the Southern States of such size as will be adapted to economic and profitable operation for the public welfare and to demonstrate forestry possibilities to the private owner.

9. BENNING NATIONAL FOREST

Whereas, on December 12, 1923, there was presented in the United States Senate by the Hon. Wm. J. Harris, Senator, from Georgia, a Bill, S-1033, entitled "To Establish the Benning National Forest in the State of Georgia,"

It Is Resolved, that the said Bill is given the endorsement of this Congress, that the Secretary so inform Senator Harris, and that he also request all Senators and Congressmen from the Southern States to cooperate in securing its adoption.

10. APPRECIATION AND THANKS

Resolved, that the Congress hereby expresses its appreciation and thanks to

(*a*) The Honorable Clifford Walker, Governor of Georgia, for his cordial welcome to the Sixth Congress, and for his strong endorsement of its purposes.

(*b*) The Honorable Paul E. Seabrook, Mayor of Savannah, for his hearty welcome, and to other members of the city administration for numerous courtesies.

(*c*) The Savannah Board of Trade, especially Manager E. B. Walker, and Mr. Nelson Stephens, Secretary of the Convention Bureau, for the wide publicity and care in arrangements which they gave the meeting; Mr. Thomas Hoynes, chairman of the entertainment committee; Mr. Robertson, chairman of the committee on decorations, and Mr. W. J. Pierpont, Jr., chairman of the committee on exhibits, and to all members of these committees, whose untiring work has made the Sixth Congress memorable and enjoyable beyond any previous Congress; Dr. S. B. McGlohon, and to the Auto and other clubs, the hotels, and many private citizens of Savannah, for courtesies extended to the Congress and its delegates during our most delightful stay in their city.

(*d*) The daily press of Savannah, and the Weekly Naval Stores Review and its editor, Mr. Thomas Gamble.

(*e*) The Georgia Forestry Association, and particularly its division chairman at Savannah, Mr. H. L. Kayton, for their untiring support.

(*f*) Our president, Mr. Bonnell H. Stone, and our Secretary, Mr. R. D. Forbes, for the splendid material condition of this organization; the Patrons, for their generous financial support; and those who have presented the inspiring papers and participated in the discussions of the Sixth Congress.

REPORT OF COMMITTEE ON NEXT PLACE OF MEETING

Your Committee has considered the requests from various cities for the holding of the Seventh Congress, invitations having been received from Richmond, Va., Columbia, S. C., Jacksonville, Fla., St. Louis, Mo., Little Rock, Ark., Asheville,

N. C., Nashville, Tenn., and Louisville, Ky. Representatives from such of these cities as cared to do so appeared in person before the Committee, which carefully weighed the arguments submitted and considered the advantages both from the viewpoint of convenience to delegates and desirability from a standpoint of the greatest good to all concerned.

The invitation from Richmond was extremely cordial and your Committee believes that Virginia is entitled to consideration, but in view of the fact that the forestry situation in Arkansas can be greatly aided by the holding of the next Congress at Little Rock, and in view of the fact that both Louisiana and Missouri, although applicants, were willing to yield in favor of the Arkansas capital, your Committee deemed it best to recommend Little Rock as the location for holding the Seventh Southern Forestry Congress, which we hereby do.

Respectfully submitted,
(Signed) H. L. KAYTON,
Chairman.

REPORT OF THE TREASURER

FIFTH SOUTHERN FORESTRY CONGRESS

Expenditures

Reporting	$ 157.00
Local Expense	31.95
Program	24.30
Proceedings:	
Printing	752.30
Forwarding	84.27
Total	$1049.82
Forward	418.13
	$1467.95

Receipts

Balance	$ 891.30
Contributions from Patrons	250.00
Sale of Proceedings:	
Single copies (113)	169.50
In bulk	157.15
	$1467.95

SIXTH SOUTHERN FORESTRY CONGRESS, INC.

Expenditures

Charter	$ 38.30
Postage	117.24
Telephone Service	33.87
Stationery and Supplies	150.74
Stenographer and Clerk	113.20
Bank Exchange, Etc.	10.00
Officials Expenditures	111.45
Badges	36.00
Forestry Instruction in Savannah Schools	125.00
Use of Theatre	113.00
Savannah School Children's Tree Naming Contest	60.60
Programs and Posters	39.00
Local Expense	41.59
Speaker's Honorarium	140.00
Reporting	202.00
Total	$1331.99
Forward	404.47
	$1736.46

Receipts

Balance	$ 418.13
Contributions from Patrons	1225.00
Coöp. Savannah School	80.00
Miscellaneous Receipts	13.33
	$1736.46

Balance on hand, April 23, 1924, $404.47.

Appendix

23921

CERTIFICATE OF INCORPORATION

OF

SOUTHERN FORESTRY CONGRESS, INCORPORATED

THIS IS TO CERTIFY, that we, the undersigned, do hereby associate ourselves into a non-stock corporation under and by virtue of the laws of the State of North Carolina, as contained in Chapter 22 of the Consolidated Statutes, entitled "Corporations," and the several amendments thereto, and to that end do hereby set forth:

1. The name of this corporation is SOUTHERN FORESTRY CONGRESS, INC.

2. The location of the principal office of the corporation in this State is in the City of Asheville, County of Buncombe.

3. The objects for which this corporation is formed are as follows:

(a) To promote the practice of forestry in the South by disseminating information as to its objects, needs, and methods, and its relation to the development of idle lands; to promote the conservation of the forests of the South in such a way that they may furnish an unfailing supply of growing timber and a home for game and birds, and that they may protect the upper sources of streams; and to promote and encourage reforestation and the prevention of forest fires.

(b) To cooperate with and to bring about a closer cooperation and unity between national, state, county, municipal, corporate and private forestry agencies and organizations.

(c) To support federal, state and local legislation which will promote, directly or indirectly, the practice of forestry in the South.

And in order properly to prosecute the objects and purposes above set forth, the corporation shall have full power and authority to purchase, lease and otherwise acquire, hold, mortgage, convey and otherwise dispose of all kinds of property, both real and personal, both in this State and in all other States, Territories and dependencies of the United States, and generally to perform all acts which may be deemed necessary for the proper and successful prosecution of the objects and purposes for which the corporation is created.

4. The corporation is to have no capital stock.

5. The names and post office addresses of the incorporators are as follows:

Name	*Post Office Address*
Joseph Hyde Pratt	Chapel Hill, N. C.
J. S. Holmes	" " " "
Miss Minnie Queen	" " " "
Miss Grace White	" " " "
Mrs. Mary Bayley Pratt	" " " "
Mrs. J. S. Holmes	" " " "
Fred B. Merrill	" " " "
George Howe	" " " "

6. The period of existence of this corporation is limited to 50 years.

7. Members may be admitted after organization upon the following terms:

Upon election and payment of dues in such manner as the corporation may determine. The persons whose names and addresses are included in the attached list are to be the charter members of the corporation.

8. The following is a list of the charter members of the corporation:

The Alger-Sullivan Lumber Co.
Edward A. Hauss, Pres.,
Century, Fla.

Dr. C. P. Ambler,
Asheville, N. C.

O. L. Ayrs,
1512 Brown-Marx Bldg.,
Birmingham, Ala.

Gordon T. Backus,
Box 629, Asheville, N. C.

Hugh P. Baker, Secretary
American Paper and Pulp Ass'n.,
New York.

W. L. E. Barnett,
Care Bankers' Trust Co.,
3 and 5 Place Vendome,
Paris, France.

Dr. S. Westray Battle,
Asheville, N. C.

Miss Alice Baxter,
31 East Fourth St.,
Atlanta, Ga.
J. M. Beal,
Professor of Botany,
A. and M. College, Miss.
H. H. Bennett,
U. S. Bureau of Soils,
Washington, D. C.
F. W. Besley,
State Forester,
815 Calvert Bldg.,
Baltimore, Md.
J. B. Bishop,
Great Southern Lumber Co.,
Pinola, Miss.
T. S. Boswell,
So. Ry. Co.,
Brevard, N. C.
Governor Wm. W. Brandon,
Montgomery, Ala.
R. G. Breland,
L. N. Dantzler Lumber Co.,
Moss Point, Miss.
B. A. Buck,
Mobile, Ala.
Thos. D. Burleigh,
University of Georgia,
Athens, Ga.
O. M. Butler,
914 Fourteenth St., N. W.,
Washington, D. C.
Camp Manufacturing Co.,
Franklin, Va.
J. Phil Campbell,
State College of Agriculture,
Athens, Ga.
W. A. Candler,
Chancellor of Emory University,
Atlanta, Ga.
G. A. Cardwell,
Agri. and Indus. Agent,
A. C. L. Ry. Co.,
Wilmington, N. C.
Austin Cary,
U. S. Forest Service,
Washington, D. C.
John J. Cathey,
Gadsen, Ala.
Champion Fibre Company,
Canton, N. C.
H. H. Chapman,
Yale Forestry School,
New Haven, Conn.
Clinchfield Coal Corp.,
Dante, Va.
Mrs. S. T. Cohen,
Treasurer City Federation Women's Clubs,
4000 Canal St.,
New Orleans, La.
Forrest H. Colby,
Bingham, Me.
Department of Conservation,
New Orleans, La.
Mrs. Edwin P. Cox,
Richmond, Va.
Edwin P. Cox,
Richmond, Va.
Crossett Lumber Co.,
Crossett, Ark.
H. M. Curran,
Farm Forestry Specialist,
Raleigh, N. C.
D. T. Cushing,
Great Southern Lumber Co.,
Bogalusa, La.
A. D. Daneel,
A. B. & A. R. R. Co.,
Atlanta, Ga.
W. J. Damtoft,
The Champion Fibre Co.,
Canton, N. C.
Henry S. Drinker,
Merion Station, Pa.
Mrs. Geo. Drolet,
Tuscaloosa, Ala.
George Drolet,
Kaul Lumber Co.,
Tuscaloosa, Ala.
Frederick Dunlap,
Care Missouri Forestry Ass'n.,
Columbia, Mo.
Hon. Robert C. Ellis,
Tifton, Ga.
W. D. Faucette,
Chief Engineer,
S. A. L. Railway Co.,
Norfolk, Va.

F. H. Fechtig,
A. C. L. R. R. Co.,
Wilmington, N. C.
Prof J. A. Ferguson,
The Penn State College,
State College, Pa.
R. T. Fisher,
Harvard University,
Weston, Mass.
Florida Development Board,
Jacksonvilla, Fla.
R. D. Forbes,
Sou. Forest Experiment Station,
New Orleans, La.
John H. Foster,
State Forester,
Concord, N. H.
E. H. Frothingham,
Box 1518,
Asheville, N. C.
Thos. H. Gill,
U. S. Forest Service,
Washington, D. C.
Henry S. Graves,
Yale University,
New Haven, Conn.
Col. W. B. Greeley, Forester,
U. S. Forest Service,
Washington, D. C.
S. Winford Greene,
McNeill, Miss.
Miss Juliet Emily Hardtner,
Urania, La.
Miss Violet Urania Hardtner,
Urania, La.
Mrs. Henry E. Hardtner,
Urania, La.
C. B. Harman, Secretary,
Sou. Sash, Door and Millwork
Mfrs. Ass'n.,
Atlanta, Ga.
R. M. Harper,
University, Ala.
W. O. Hart,
134 Carondelet St.,
New Orleans, La.
Frank E. Haskell,
Yale Forestry School,
New Haven, Conn.
Alfred B. Hastings,
Asst. State Forester,
University, Va.
A. M. Henry,
Tallahassee, Fla.
Hon. Frank R. Hewitt,
311 Montford Ave.,
Asheville, N. C.
A. E. Hickerson,
Supt. Delta Land and Timber Co.,
Conroe, Texas
John Sprunt Hill,
Durham, N. C.
Mrs. S. W. Hills,
Robinson Road, R. 3,
Grand Rapids, Mich.
W. R. Hine,
Urania, La.
Roy L. Hogue,
Interior Lumber Co.,
Jackson, Miss.
J. S. Holmes,
State Forester,
Chapel Hill, N. C.
H. B. Holroyd,
Agriculturist and Forester,
L. and N. R. R. Co.,
Louisville, Ky.
Robert R. Hope,
Georgetown, S. C.,
Care James D. Lacey & Co.,
350 Madison Ave., New York.
Ralph D. Hosmer,
Cornell University,
Ithaca, N. Y.
E. E. Jackson Lumber Co.,
Baltimore, Md.
Max Jasspon, Forest Engineer,
Box 203, Savannah, Ga.
J. K. Johnson,
Great Southern Lumber Co.,
Bogalusa, La.
W. Goodrich Jones,
21114 Barnard St.,
Waco, Texas
Chapin Jones, State Forester,
Charlottesville, Va.
John L. Kaul,
Kaul Lumber Co.,
Birmingham, Ala.

Kaul Lumber Co.,
  Birmingham, Ala.
Milton Klein,
  Atlanta Hoo Hoo Club,
  Atlanta, Ga.
H. H. Kopman,
  Asst., Game Division,
  Department of Conservation,
  New Orleans, La.
Krause & Managan Lbr. Co., Ltd.,
  Westlake, La.
Otto Katzenstein,
  Atlanta, Ga.
W. M. Lambert,
  1102 Southwest Ave.,
  Johnson City, Tenn.
Rev. Geo. W. Lay,
  Beaufort, N. C.
Leas & McVitty, Inc.,
  Salem, Va.
J. G. Lee, Prof.,
  A. and M. College,
  Baton Rouge, La.
J, W. LeMaistre,
  Lockhart, Ala.
J. W. Lewis, Gen. Mgr.,
  The Long-Bell Lumber Co.,
  Lake Charles, La.
Lock, Moore & Co., Ltd.,
  Westlake, La.
E. N. Lowe, Director,
  Mississippi Geological Survey,
  Jackson, Miss.
Louisiana State University,
  Baton Rouge, La.
B. M. Lufburrow,
  Acting Forest Supervisor,
  Forest Service,
  Moulton, Ala.
R. S. Maddox, State Forester,
  Nashville, Tenn.
J. M. Mallory, Gen. Indus. Agent,
  Savannah, Ga.
Mrs. Annie D. Martin,
  Woddfields,
  Hendersonville, N. C.
E. D. Mays,
  S. A. L. R. R Co,
  Jacksonville, Fla.
J. Alfred Mitchell,
  Forest Service,
  Washington, D. C.
Sydney L. Moore,
  Jacksonville, Fla.
R. F. Morse, Gen. Mgr.,
  Long-Bell Company,
  Quitman, Miss.
Mrs. Louis A. Neill,
  446 Jackson St.,
  Albany, N. Y.
J. G. Pace,
  Pace Lumber Co.,
  Pensacola, Fla.
Charles Lathrop Pack, Pres.,
  American Tree Association,
  Lakewood, N. J.
H. H. Patterson,
  Artmore, Ala.
John L. Patterson,
  Richmond, Va.
The Pennsylvania State College,
  State College, Pa.
J. G. Peters,
  U. S. Forest Service,
  Washington, D. C.
Karl E. Pfeiffer, Asst. Forester,
  815 Calvert Bldg,
  Baltimore, Md.
Mrs. Mary Bayley Pratt,
  Chapel Hill, N. C.
Col. J. H. Pratt,
  Director Geological and Economic Survey,
  Chapel Hill, N. C.
J. H. Price,
  Price & Price,
  Magnolia, Miss.
Miss Minnie Queen,
  Chapel Hill, N. C.
I. T. Quinn, Com. of Conservation,
  Montgomery, Ala.
E. E. Randolph,
  State College,
  Raleigh, N. C.
Mrs. Ora M. Randolph,
  State College,
  Raleigh, N. C.

Harris A. Reynolds,
4 Joy St.,
Boston, Mass.
Verne Rhoades,
U. S. Forest Service,
Asheville, N. C.
C. L. Ritter Lumber Co.,
Huntington, W. Va.
H. H. Burns, Treas.,
C. L. Ritter Lumber Co.,
Huntington, W. Va.
Hon. Lee M. Russell, Governor,
Jackson, Miss.
Thorndike Saville,
Chapel Hill, N. C.
Jas. R. Schick,
Engineer Branch Lines N. & W. R. R. Co.,
Roanoke, Va.
Walter G. Schwab, Dist. Mgr.,
Glatfelter Pulpwood Co.,
La Plata, Md.
W. D. Faucette, Chief Engr.,
S. A. L. R. R. Co.,
Norfolk, Va.
Edmund Secrest, State Forester,
Ohio Agr'l Experiment Sta.,
Wooster, Ohio.
A. Sessoms,
Bank of Bonifay,
Bonifay, Fla.
Edmund Seymour,
The American Bison Society,
45 Wall St., New York.
D. F. Shull,
206 South 41st St.,
Philadelphia, Pa.
Jos. S. Silversteen, Pres.,
The Gloucester Lumber Co.,
Rosman, N. C.
Howard C. Smith,
Union Springs, Ala.
Jas. Sinclair,
A. C. L. R. R. Co.,
Waycross, Ga.
Hon. John H. Small,
940 Munsey Bldg.,
Washington, D. C.
V. H. Sonderegger,
Supt. of Forestry,
Department of Conservation,
New Orleans, La.
Andrew M. Soule, Pres.
State College of Agriculture,
Athens, Ga.
Southern Pine Lumber Co.,
Texarkana, Texas
Miss Vera M. Spuhler,
Southern Forest Experiment Sta.,
New Orleans, La.
Mrs. W. W. Stark,
Federation of Women's Clubs,
Commerce, Ga.
Office of State Forester,
College Station, Texas
Mrs. A. F. Storm,
Morgan City, La.
E. F. Stovall, Gen. Agt,
L. C. R. R.,
Birmingham, Ala
Mrs. Alice Strickland,
Duluth, Ga.
Henry P. Talmadge, Pres.
Sale-Davis Co.,
52 William St.,
New York City.
Miss Julia A. Thorns,
Asheboro, N. C.
E. W. Thorpe,
De Funiak Springs, Fla.
J. W. Toumey,
Yale Forestry School,
New Haven, Conn.
W. B. Townsend,
Little River Lumber Co.,
Townsend, Tenn.
Mrs. W. D. Tyler,
Dante, Va.
W. D. Tyler, Pres.
Southern Forestry Congress,
Dante, Va.
Union Sawmill Co.,
Huttig, Ark.
S. H. Vredenburgh,
Vredenburgh Sawmill Co.,
Vredenburgh, Ala.

Hon. Zebulon Weaver,
Asheville, N. C.
J. Roland Weston,
Logtown, Miss.
Wm. P. Wharton,
Mass. Forestry Association,
Groton, Mass.
Wier Long Leaf Lumber Co.,
Houston, Texas
J. C. Williams, Mgr.,
Development Service
Southern Ry. Co.,
Washington, D. C.
James A. Wilson,
Box 304, Shelby, N. C.
Mrs. John D. Winters,
Montgomery, Ala.
Theodore S. Woolsey, Jr.,
242 Prospect St.,
New Haven, Conn.
Geo. Wrigley,
Greenville, S. C.
L. J. Young,
University of Michigan,
Ann Arbor, Mich.

In Testimony Whereof, We have hereunto set our hands and affixed our seals, this the second day of November, A. D. 1923.

Joseph Hyde Pratt (SEAL)
J. S. Holmes (SEAL)
Minnie Queen (SEAL)
Grace White (SEAL)
Mary Bayley Pratt (SEAL)
Mrs. J. S. Holmes (SEAL)
Fred B. Merrill (SEAL)
George Howe (SEAL)

Signed, sealed and delivered in
the presence of M. B. Utley, Witness.

STATE OF NORTH CAROLINA, } ss.
County of Orange, }

This is to Certify, that on this 2d day of Nov., A. D. 1923, before me, a Notary Public, personally appeared Joseph Hyde Pratt, J. S. Holmes, Minnie Queen, Grace White, Mary Bayley Pratt, Mrs. J. S. Holmes, Fred Merrill, George Howe, who, I am satisfied, are the persons named in and who executed the foregoing certificate of incorporation of Southern Forestry Congress, Inc., and I having first made known to them the contents thereof, they did each acknowledge that they signed, sealed and delivered the same as their voluntary act and deed, for the uses and purposes therein expressed.

In testimony whereof, I have hereunto set my hand and affixed my official seal, this the 2d day of Nov., A. D. 1923.

M. B. UTLEY, Notary Public.

Com. exp. Sept. 7, '24 (Notarial Seal)
Filed Nov. 5, 1923.
W. N. EVERETT,
Secretary of State.

Appendix II

BY-LAWS OF THE SOUTHERN FORESTRY CONGRESS, INCORPORATED. ADOPTED BY VOTE OF THE SIXTH CONGRESS, AT SAVANNAH, GEORGIA, JANUARY 30, 1924.

1. *Name:* The name of this corporation shall be the Southern Forestry Congress, Inc.

2. *Object:* The objects for which this corporation is formed are as follows:

(*a*) To promote the practice of forestry in the South by disseminating information as to its objects, needs, and methods, and its relation to the development of idle lands; to promote the conservation of the forests of the South in such a way that they may furnish an unfailing supply of growing timber and a home for game and birds, and that they may protect the upper sources of streams; and to promote and encourage reforestation and the prevention of forest fires.

(*b*) To coöperate with and to bring about a closer coöperation and unity between national, state, county, municipal, corporate and private forestry agencies and organizations.

(*c*) To support federal, state and local legislation which will promote, directly or indirectly, the practice of forestry in the South.

3. *Membership and Dues:* Any person interested in the objects of the Congress may become a member, as hereinafter provided.

a. Members shall be of four classes:

Annual Members, who shall pay a fee sufficient to cover the cost of a copy of the Proceedings, to be decided by the Executive Committee, but not to exceed $2.

Associate Members, consisting of State Departments and Associations, who shall pay a sum not to exceed $25, to be decided by the Executive Committee.

Contributing Members, consisting of persons, firms and corporations, who shall from time to time make material cash contributions to the expenses of the Congress.

Honorary Members, persons eminent in some line of work more or less closely connected with the objects of the Congress. Honorary members shall be elected by the annual Congress after being considered and recommended by the Executive Committee. They shall not be subject to annual dues, but shall have every other privilege of full members.

b. Only members shall be eligible to office and entitled to vote; provided that unless the point of order is raised and sustained all persons who have registered for any regular meeting of the Congress may vote at that Congress. Associate and contributing members will be considered to have voted when their representatives have voted. Associate members may have not to exceed four voting representatives for annual dues of $10, up to ten voting representatives for dues of $25. Contributing members may be represented according as to whether they are persons (1 voting representative), firms (2 voting representatives), or corporations (4 voting representatives).

4. *Officers:* The officers of this corporation shall be a President, a Vice-President, a Chairman of the Executive Committee, a Secretary, a Treasurer, but the Secretary and Treasurer may be one and the same person, and as Assistant Secretary, each of whom holds office for one year, or until his successor has been duly elected and qualified.

5. *Committees:* There shall be four regular standing committees: an Executive Committee and Committees on Finance, Legislation and Publicity. The *Executive Committee* shall consist of the Chairman, who is elected by the Congress, the four other officers of the Congress and the Chairmen of the three other standing Committees, and the past Presidents of the Congress. It shall decide the policy of the Congress and be responsible for its activities.

At all formally called meetings of the Executive Committee three members shall be qualified to transact any business that may come before it. The Chairmen of the other three Committees shall be appointed annually by the incoming President. Each Chairman shall appoint the members of his own Committee and be responsible for its activities, subject to the approval of the President.

At each annual meeting the President shall appoint regular Committees on Auditing, Resolutions and Nominations, each committee to be entrusted with the duties usually devolving on such committees. The President shall appoint such other special committees as may be called for by the Congress.

6. *Publications:* The Proceedings of the Congress, in as full a form as seems advisable to the Executive Committee, shall be published as soon after each annual meeting as is practicable and distributed, one to each member who has paid his annual dues. Contributing and associate members may receive additional copies in accordance with the decision of the Executive Committee. Complimentary copies may be sent out as decided by the Executive Committee.

7. *Meetings:* The Congress shall meet annually or as *nearly* so as is practicable, at such time and place as may be decided on by the Executive Committee. At any regular meeting of the Congress twenty members, or a majority of those registered, will be considered a quorum. Meetings of the Executive Committee shall be held before each annual meeting of the Congress and at such other times as the Chairman may deem necessary.

8. *Amendments:* These By-Laws may be amended by a three-fourths vote of the members present and entitled to vote at the annual meeting of the Congress.

Appendix III

PATRONS*

SIXTH SOUTHERN FORESTRY CONGRESS

ALABAMA

Kaul Lumber Co., Birmingham.
The Scotch Lumber Co., Mobile.
Jackson Lumber Co., Lockhart.
W. P. Brown Lumber Co., Fayette.
Vredenburgh Sawmill Co., Vredenburgh.
Horse Shoe Lumber Co., River Falls.
Lathrop Lumber Co., Birmingham.
Deal Lumber Co., Buhl.
Allison Lumber Co., Inc., Bellamy.
W. T. Smith Lumber Co., Chapman.

FLORIDA

Alger-Sullivan Lumber Co., Century.
J. Ray Arnold Lumber Co., Groveland.
Putnam Lumber Co., Jacksonville.
Taylor Co. Lumber Co., Springdale.
Standard Lumber Co., Live Oak.
Brooks-Scanlon Corp., Eastport.
St. Andrews Bay Lumber Co., Millville.
Bagdad Land & Lumber Co., Bagdad.
Weaver-Loughridge Lumber Co., Boyd.
W. B. Harbeson Lumber Co., De Funiak Springs.

KENTUCKY

Combs Lumber Co., Lexington.
Ruby Lumber Co., Madisonville.
Langstaff-Orm Lumber Co., Paducah.
Sherrill-Russell Lumber Co., Paducah.
Hon Lumber Co., Winchester.
J. N. Russell Lumber Co., Bowling Green.

---

* Those who contribute towards the expenses of the Congress are termed Patrons.

W. J. Hughes & Sons Co., Inc., Louisville.
Fred G. Jones & Co., Inc., Louisville.
C. W. Brickly Lumber Co., Louisville.
Norman Lumber Co., Louisville.

LOUISIANA

L. N. Dantzler Lumber Co., New Orleans.
Powell Lumber Co., Lake Charles.
Hillyer-Deutsch-Edwards, Inc., Oakdale.
Lock, Moore & Co., Ltd., Westlake.
W. G. Ragley Lumber Co., Ragley.
Gulf Lumber Co., Fullerton.
J. A. Bel Lumber Co., Inc., Lake Charles.
Vernon Parish Lumber Co., Inc., Kurthwood.
Louisiana Central Lumber Co., Clarke.
Natalbany Lumber Co., Ltd., Hammond.
Peavy-Byrnes Lumber Co., Shreveport.
Industrial Lumber Co., Elizabeth.
Frost-Johnson Lumber Co., Shreveport.
Great Southern Lumber Co., Bogalusa.

MISSISSIPPI

Interior Lumber Co., Jackson.
Houston Bros., Vicksburg.
Long-Bell Co., Quitman.
H. Weston Lumber Co., Logtown.
Finkbine Lumber Trustees, Jackson.
L. N. Dantzler Lumber Co., Gulfport.
Rosa Lumber Co., Picayune.

MISSOURI

John H. Himmelberger, Cape Girardeau.
Delta Land & Timber Co., Kansas City.
Bowman-Hicks Lumber Co., Kansas City.
Long-Bell Lumber Co., Kansas City.
Ozark Land & Lumber Co., Winona.
Thomas & Proetz Lumber Co., St. Louis.

MARYLAND

E. E. Jackson Lumber Co., Baltimore.

NORTH CAROLINA

Gennett Lumber Co., Asheville.
Suncrest Lumber Co., Sunburst.

OHIO

W. M. Ritter Lumber Co., Columbus.

VIRGINIA

Clinchfield Coal Corp., Dante.
Pocahontas Fuel Co., Inc., Pocahontas.
Guyan Lumber Co., Roanoke.
Norfolk & Western Ry. Co., Roanoke.
Pocahontas Coal & Coke Co., Roanoke.

WEST VIRGINIA

Norwood Lumber Company, Welch.

R. D. FORBES, *Treas.*,
April 23, 1924.

Appendix IV

LIST OF REGISTERED DELEGATES

ATTENDING THE

SIXTH SOUTHERN FORESTRY CONGRESS

Acosta, St. Elmo W.	Jacksonville, Fla.
Anderson, Mr.	Anderson Hardwood Lumber Co., Marion, S. C.
Babcock, C. F.	Babcock Bros. Lumber Co., Babcock, Miller Co., Ga.
Bailey, M. L.	Gresston, Ga.
Baker, C. E.	303 East Huntington, Savannah, Ga.
Baker, Mrs. C. E.	303 East Huntington, Savannah, Ga.
Barbee, H. V.	Gresston, Ga.
Barnes, J. W.	Mendal Building, Box 228, Savannah, Ga.
Barnett, Mrs. B. H.	Florida Forestry Ass'n., 735 Riverside Ave., Jacksonville, Fla.
Barnett, W. L'E.	Florida Forestry Ass'n., Mt. Dora, Fla.
Barnett, Mrs. W. L'E.	Florida Forestry Ass'n., Mt. Dora, Fla.
Bauer, E.	2610 Blossom St., Columbia, S. C.
Beale, C. Bernard	Division of Forestry, University of Georgia, Athens, Ga.
Bennett, Russell W.	Secretary-Manager, Standard Containers Mfrs., Sec'y, Florida Forestry Ass'n., Jacksonville, Fla.
Benson, A. A.	Lockhart, Ala.

Blitch & De Loach	Blitchton, Ga.
Boyarth, W. A.	Williamsburg, Va.
Brooke, R. H	Little Rock, Ark. Ark. Soft Pine Bureau, Rep.
Bruen, H. H	Columbia Naval Stores Co., Savannah, Ga.
Bruner, E. Murray	Inspector, U. S. Forest Service, Asheville, N. C.
Burleigh, Thos. D	Division of Forestry, State College of Agriculture, Athens, Ga.
Burrage, C. H	James D. Lacey & Co., Timber Land Factors, New York.
Butler, O. M	American Forestry Ass'n., Washington, D. C.
Cain, Mrs. J. R	108 Park Ave., East, Savannah, Ga.
Calvert, W. C	W. J. Snead Lumber Co., Greenwood, S. C.
Caples, M. J	Vice-President, S.A.L. Ry. Co., Norfolk, Va.
Cargill, G. S	Superior Court Chamber, Savannah, Ga.
Carr, A. S	President, The A. S. Carr Co., Bainbridge, Ga.
Carr, Wm. B	Bainbridge, Ga.
Carson, J. A. G., Jr.,	Vice-President, Carson Naval Stores Co., Savannah, Ga.
Cary, Austin	U. S. Forest Service, Washington, D. C.
Coker, J. L	Carolina Fibre Co., Hartsville, S. C.
Colly, J. A.	Blackshear, Ga.
Coleman, F. J	Cobbtown, Ga.
Comings, W. D	Box 595, Georgetown, S. C.
Cook, J. M	Milan, Ga.
Cooper, Robert L	Savannah, Ga.

Coult, A. A.	Secretary, Florida Development Board, Jacksonville, Fla.
Cossels, A. Gordon	President, The Cossels Co., Savannah, Ga.
Council, K. Clyde	Wananish, N. C.
Curran, H. M.	Agricultural Extension Service, Raleigh, N. C.
Dabbs, E. W.	Mayesville, S. C.
De Loach, R. C.	Furman, S. C.
Dent, Gratz	County Agent, Savannah, Ga.
Derby, L. H.	Warren, Ark.
Dill, C. W.	New York (Naval Stores)
Dillon, Mrs. Julia Lester	City Forester, Sumter, S. C.
Doherty, Chas. P.	295 Henderson Ave., Athens, Ga.
Dorman, Miss Caroline C.	Chm. Conservation, La. Federation Women's Clubs, Saline, La.
Drawdy, S. L.	Homerville, Ga.
Drew, D. S.	Dunlevie Pine Products Co., Allenhurst, Ga.
Drew, Herbert J.	Standard Lumber Company, Live Oak, Fla.
Dudley, C. H.	Atlanta, Ga.
Dunlap, Frederick	Secretary, Mo. Forestry Ass'n., Columbia, Mo.
Dyal, J. E.	Baxley, Ga.
Eaton, J. L.	Viola, Tenn.
Ellis, W. P.	Furman, S. C.
Forbes, R. D.	Southern Forest Experiment Station, New Orleans, La.
Frampton, W. E.	Charleston, S. C.
Frothingham, E. H.	Appalachian Forest Experiment Station, Asheville, N. C.
Fowler, James	Soperton, Ga.
Foster, J. A.	308 East Hall St., Savannah, Ga.

Fell, Mrs. H. L.	506-37th St. West, Savannah, Ga.
Farie, A. L., Jr.	Savannah Bank Bldg., Savannah, Ga.
Farie, A. L.	President, A. L. Farie Company, Savannah, Ga.
Garrett, George A.	Professor of Forestry, University of the South, Sewanee, Tenn.
Gay, E. C.	Biloxi, Miss.
Garroson, J. E.	Ludowici, Ga.
Gerry, Dr. Eloise	Forest Products Laboratory, Madison, Wisconsin.
Glenn, E. C.	Big Salkehatchie Cypress Co., Varnville, S. C.
Glover, Joseph	421 E. 45th St., Savannah, Ga.
Goodwillie, D. L.	838 Otis Building, Chicago, Ill.
Gordon, H. H.	McGregor, Ga.
Hale, Matthew	Greenville, S. C.
Harrell, E. C.	Secretary, Ga., Fla. Saw Mill Ass'n., Jacksonville, Fla.
Holland, W. D.	Collins, Ga.
Harman, C. B.	Atlanta, Ga., (Ga. Forestry Ass'n.)
Hastings, Alfred B.	Assistant State Forester, Charlottesville, Va.
Henly, J. H. L.	Lockhart, Ala.
Hodges, C. S.	Cyrene, Decatur County, Ga.
Hodges, W. C.	Hinesville, Ga.
Holmes, J. S.	Chapel Hill, N. C. State Forester, N. C. Geological and Economic Survey.
Houston, Philip D.	Randolph Bldg., Memphis, Tenn.

Howard, T. L.	Ludowici, Ga.
Hunter, K. W.	Sewanee River Cypress Co., Box 434, Jacksonville, N. C.
Huxford, Folks	Homerville, Ga.
Israel, Albert R.	Southern Pine Association, New Orleans, La.
Jackson, J. P.	General Agricultural Agent, Central of Georgia Rwy., Savannah, Ga.
Jasspon, Max	Savannah, Ga.
Johnston, Don P.	Johnston-McNeill & Co., Okeechobee, Fla.
Jones, Jas. H.	Land Agent, The Alger-Sullivan Lumber Co., Century, Fla.
Jordan, R. F.	Glenwood, Ga.
Judd, Mrs. M. E.	Dalton, Ga.
Kayton, H. L.	Vice-President, Carson Naval Stores Co., Savannah, Ga.
Kenney, A. R.	Chief Tie and Timber Agent, A. C. L. R. R., Waycross, Ga.
Kirklighter, S. J.	Glenville, Ga.
Kirkland, J. B.	Waycross, Ga.
Kirkland, D.	Kirkland & Co., Denton, Ga.
Leffiteau, E. E.	T. P. & F. A., Merchants & Marine Trans. Co., Savannah, Ga.
Landry, M. B.	339 Carondelet St., New Orleans, La.
Lee, Maj. J. G.	L. S. U., Baton Rouge, La.
Lockwood, J. E.	Mgr. Naval Stores Division, Hercules Powder Company, Wilmington, Delaware.
Loughridge, J. H.	Perry, Fla.
Lott, Dan	Waycross, Ga.

Macfarland, F. H.	1130 E. Henry St., Savannah, Ga.
McCaffery, J. E.	Savannah River Lumber Co., Savannah, Ga.
McKee, E. R.	Deputy Forest Supervisor, Florida National Forest, Valparaiso, Fla.
McLendon, H. S.	Agricultural Agent, F. E. C. Railway, St. Augustine, Fla.
Mallory, J. M.	General Industrial Agent, Central of Georgia Rwy., Savannah, Ga.
Marks, R. P., Jr.	1119 East 32nd St., Savannah, Ga.
Miller, D. C.	Lambert, Ga.
Miller, E. C.	Senator, 2nd District, Hinesville, Ga.
Monighan, Francis	650 Reese St., Athens, Ga.
Moore, A. C.	Columbia, S. C.
Moore, A. G. T.	Southern Pine Ass'n., New Orleans, La.
Morgan, Henry C.	Homerville, Ga., Senator 5th District.
Morgan, J. Wm.	Columbia Naval Stores Co., Savannah, Ga.
Morton, Jas. W.	Athens, Ga.
Moseley, W. S.	Collins, Ga.
Mensby, C. L.	Columbia Naval Stores Co., Savannah, Ga.
Musgrove, W. V.	Homerville, Ga.
Nash, J. G.	President, Columbia Naval Stores Co., Savannah, Ga.
Newsome, T. A.	Tuscaloosa, Ga.
Newton, D. C.	Claxton, Ga.
Norton, Eliot	Interstate Tr. & Banking Co., New Orleans, La.
Nuite, Chas. W.	Department of Forestry, University of Ga.

Ounler, Mrs. S. H	703 Whitaker St., Savannah, Ga.
Overstreet, M. O	Orlando, Fla. (Member Florida State Senate)
Pace, J. G	Pace Lumber Co., Pensacola, Fla.
Peeples, Miss Doris	303 E. Huntington St., Savannah, Ga.
Pendleton, Lawson, Corp	Bryn Athyn, Pa.
Peters, J. G	U. S. Forest Service, Washington, D. C.
Potter, L. B	Columbia Naval Stores Co., , Savannah, Ga.
Pratt, Joseph Hyde	Asheville, N. C. President Western N. C. Inc.
Pringle, L. V	Biloxi, Miss.
Rains, G. S	Southern Freight Ass'n., Atlanta, Ga.
Rahn, A.	Glennville, Ga.
Ray, G. A.	Baxley, Ga.
Rice, Miss O	Scott, Ga.
Rice, S. P	Scott, Ga.
Rice, Mrs. S. P	Scott, Ga.
Rietz, Paul R	State College of Agriculture, Athens, Ga.
Robertson, E. H	Guyton, Ga.
Rogers, J. F	Cochran, Ga.
Rose, E. P	Valdosta, Ga.
Rountree, J. Leonard	Summit, Ga.
Sapp, J. M	Savannah, Ga.
Saunders, W. C	Walterboro, S. C.
Schick, James Reese	Engineer Branch Lines, N. & W. Rwy., Roanoke, Va.
Schick, Mrs. James Reese	Roanoke, Va.
Sessoms, Alex K	Cogdell, Ga.
Sheppard, James O	Edgefield, S. C.
Shingler, Geo. P., Jr	U. S. Customs House, Savannah, Ga.

Shoemaker, Mrs. Z. T	Massillon, Ohio.
Siecke, E. O	State Forester, College Station, Tex.
Simons, Harriet P. (Mrs. Albert)	84 South Bay St., Charleston, S. C.
Sinclair, C. W	Madison, Fla.
Sizer, Mrs. John H	425 Bull St., Savannah, Ga.
Skeele, H. B	116 W. Gaston St., Savannah, Ga.
Smith, D. A	Wytheville, Va.
Smith, Hogan	Sampson City, Fla.
Smith, Howard C	Union Springs, Ala.
Smith, R. H	Hawthorne, Fla.
Snead, W. J	W. J. Snead Lumber Co., Greenwood, S. C.
Snooks, B. R	Ailey, Ga.
Spahr, H. G	Atlanta, Ga. (Georgia Forestry Ass'n.)
Speh, Carl F	Turpentine & Rosin Producers' Ass'n, New Orleans, La.
Spell, C. J	Lyons, Ga.
Spell, G. S	Lyons, Ga.
Spell, T. P	Lyons, Ga.
Stevens, J. P	Savannah, Ga.
Stillwell, Wm. B	Savannah, Ga., Box 522, (Southern Pine Co. of Ga.)
Stone, Bonnel H	Bairsville, Ga. (Georgia Forestry Assn.)
Strain, W. H.	1602 E. Henry St., Savannah, Ga.
Sumner, J. W.	Scott, Ga.
Tilghman, H. L	Marion, S. C.
Thomas, D. R	Agricultural and Industrial Agent, Tenrille, Ga.
Tillett, A. C	Asst. to Vice-Pres., Seaboard Air Line Rwy., Norfolk, Va.

Tison, R. R.	Ridgeland, S. C., Supt. of Education, Jasper County, S. C.
Tyler, W. D.	Clinchfield Coal Corp., Dante, Russell Co., Va.
Tyler, Mrs. W. D.	Dante, Va.
Veitch, F. P.	U. S. Dept. of Agriculture, Washington, D. C.
Veal, W. L.	Baxley, Ga.
Ucker, Clement S., Jr.	Cogdell, Ga.
Ulmer, M. W.	Largo, Fla.
Woodruff, A. J.	Decatur, Ga.
Williams, W. K.	Crossett Lumber Co., Crossett, Ark.
Wood, A. D.	Champion Fibre Co., Canton, N. C.
Willet, N. L.	Agricultural Agent, C. & N. C. R. R., Augusta, Ga.
Ward, J. O.	Blacksburg, Ga.
Wernicke, O. H. L.	Pensacola Tar & Turpentine Company, Gull Point, Fla.
Weston, J. Roland	H. Weston Lumber Co., Logtown, Miss.
Weston, Mrs. J. Roland	Logtown, Miss.
Whatley, Mrs. E. T.	1119 E. Duffy St., Savannah, Ga. Representing Lachlan McIntosh Chapter of D. A. R.
White, W. E.	Citrus Fruit Growers, New Port Richey, Fla.
Whittin, J. L.	Hinesville, Ga.
Willcox, W. A.	Milan, Ga.
Williamson, Wm. W.	26 Bay E., Savannah, Ga.
Wood, A. V.	1707 Gloucester St., Brunswick, Ga.
Wood, B. O.	Pavo, Ga.
Woods, John B.	Forest Engineer, Long-Bell Lumber Co., Kansas City, Mo.

Wrigley, George	Greenville, S. C. Electrical Engineer, J. E. Sirrine & Co.
Wyman, Lenthall	U. S. Forest Service, Starke, Fla.
Young, W. D.	521 College Street, Fort Valley, Ga.

PROCEEDINGS

OF THE

Seventh Southern Forestry Congress

HARDWOODS AND PINES
SOUTHERN PULPWOOD
FORESTRY POLICY
NAVAL STORES

[illegible]
LITTLE ROCK, ARK.
[illegible]

PROCEEDINGS

OF THE

Seventh Southern Forestry Congress

HELD AT

LITTLE ROCK, ARK.

JANUARY 19-22, 1925.

THE SEEMAN PRINTERY, INC.
DURHAM, N. C.
1925

OFFICERS

OF THE

SEVENTH SOUTHERN FORESTRY CONGRESS

PRESIDENT......J. S. HOMES, *State Forester*
RALEIGH, N. C.

VICE-PRESIDENT......H. L. KAYTON,
Vice-Pres., Carson Naval Stores Co.
SAVANNAH, GA.

SECRETARY-TREASURER......C. B. HARMAN,
Secretary, So. Sash, Door & Mill Work Association.
ATLANTA, GA.

ASSISTANT SECRETARY......W. K. WILLIAMS, *Crosett Lumber Co.*
CROSSETT, ARK.

CHAIRMAN EXECUTIVE COMMITTEE......JOSEPH HYDE PRATT,
Pres. Western North Carolina, Inc.
ASHEVILLE, N. C.

CHAIRMAN FINANCE COMMITTEE......V. H. SONDEREGGER,
State Forester.
NEW ORLEANS, LA.

CHAIRMAN PUBLICITY COMMITTEE......R. D. FORBES,
Director, Southern Forest Experiment Station.
NEW ORLEANS, LA.

EXECUTIVE COMMITTEE—The above officers, together with all former Presidents of the Congress, constitute the Executive Committee.

THE FORMER PRESIDENTS ARE:	*Elected*
COL. JOSEPH HYDE PRATT, Chapel Hill, N. C.	1916
HON. HENRY E. HARDTNER, Urania, La.	1920
MR. ROY L. HOGUE, Jackson, Miss.	1921
MR. W. D. TYLER, Dante, Va.	1922
MR. BONNELL H. STONE, Blairsville, Ga.	1923

EDITOR'S NOTE

The Southern Forestry Congress was organized in Asheville, N. C., in July 1916, at a meeting which had been called by Dr. Joseph Hyde Pratt, then State Geologist of North Carolina. Participating Associations in this Convention were: North Carolina Forestry Association, Association of Eastern Foresters, American Forestry Association, Society of American Foresters, North Carolina Pine Association, and Appalachian Park Association. This Congress resolved to perpetuate itself as the Southern Forestry Congress, but owing to the War the second meeting was not held until January 1920. Since that time the meetings have been annual.

The proceedings of each Congress have been printed for distribution to delegates and others interested in Southern forestry through contributions made by patrons, most of whom are Southern lumbermen. Most of these volumes are now out of print but an occasional one can be secured from one or other of the State Forestry Associations which purchased a portion of some of the editions for distribution to their members.

The present volume includes all the papers that were presented at the Seventh Southern Forestry Congress, but the discussions, many of which were of exceptional interest, have been omitted, principally because it has been necessary to hold the cost within the resources of the Congress. The Secretary brought all the papers together and made copies of a number of them; but partly because the printing was to be done in North Carolina, the final revision work was turned over to the present Editor. The apologies of this same Editor are hereby made to some of those who contributed papers, as well as to the readers, for certain changes which have been arbitrarily made. The desire to get this volume out before the next Congress is the chief excuse for not consulting the authors in certain cases.

J. S. Holmes, *Editor*.

December 10, 1925.

CONTENTS

PAGE

WELCOMING ADDRESS, *Gov. Tom J. Terral*.............. 7

RESPONSE, *Mr. W. D. Tyler*.......................... 8

PRESIDENTIAL ADDRESS: "Public Ownership of Forests," *Mr. J. S. Holmes* 9

REPORT OF THE TREASURER, *Mr. C. B. Harman*.......... 17

COMMITTEES APPOINTED 17

"WHAT PRACTICAL FORESTRY CAN DO FOR ARKANSAS," *Hon. J. R. Hamlen* 18

"INITIAL STEPS IN STATE FORESTRY LEGISLATION," *Mr. J. G. Peters* 23

"THE ORGANIZATION OF STATE FORESTRY DEPARTMENTS AND FIRE PREVENTIVE SYSTEMS," *Major Page S. Bunker* 30

"DEFERRED TAXATION," *Hon. Henry E. Hardtner*........ 36

"HOW MAY STATES BEST FINANCE FORESTRY," *Hon. Geo. Vaughn* 40

"PROPOSED FORESTRY LAW FOR ARKANSAS," *Dr. A. C. Millar* 46

"FORESTRY PROBLEMS IN SHORTLEAF PINE," *Prof. Frederick Dunlap* 50

"GROWING PINE IN THE NATIONAL FORESTS," *Mr. Charles A. Plymale* 52

"IMPROVED LOGGING PRACTICE IN SHORTLEAF PINE," *Mr. W. K. Williams* 53

DISCUSSION, *Mr. E. W. Gates* and *Mr. Eugene Watt*....58, 59

"THE CLARKE-MCNARY LAW; ITS LIMITATIONS AND POSSIBILITIES," *Hon. E. A. Sherman*................ 60

"SAVING TIMBER," *Dr. Herman von Schrenk*............ 67

"NATIONAL FORESTS FOR THE EASTERN HALF OF THE UNITED STATES," *Mr. Shirley W. Allen*.............. 69

PAGE

"THE PAST, PRESENT AND FUTURE OF FORESTRY AND LUMBERING IN THE SOUTHERN UNITED STATES," *Mr. Bolling Arthur Johnson* 74

"PROBLEMS OF HARDWOOD TIMBER PRODUCTION," *Mr. E. F. McCarthy* 76

"PROBLEMS IN THE MANAGEMENT OF ARKANSAS AND LOUISIANA HARDWOODS," *Mr. J. B. Woods*.......... 84

"HARDWOODS OF THE SOUTH," *Mr. V. H. Sonderegger*.... 90

"THE PULP AND PAPER INDUSTRY IN THE SOUTH," *Mr. R. W. Fannon* 95

"GROWING TREES FOR PULP AND LUMBER AT BOGALUSA, LA.," *Mr. J. K. Johnson*................101

"WHY NOT MORE KINDS OF SOUTHERN PAPERS?" *Mr. Vance P. Edwardes* 105

"FUTURE OF SOUTHERN PAPER PRODUCTION," *Mr. J. H. Allen* 110

REPORT OF NAVAL STORES COMMISSION, *Mr. W. L'E. Barnett, Secy.* 113

"PROPOSED PLAN OF NAVAL STORES INSTITUTE," *Mr. O. H. L. Wernicke* 143

RESOLUTIONS ADOPTED BY SEVENTH SOUTHERN FORESTRY CONGRESS 153

REPORT OF COMMITTEE ON PLACE OF MEETING..........156

REPORT OF COMMITTEE ON NOMINATIONS..............157

APPENDIX I. LIST OF PATRONS OF THE SEVENTH SOUTHERN FORESTRY CONGRESS 158

APPENDIX II. LIST OF REGISTERED DELEGATES ATTENDING THE SEVENTH SOUTHERN FORESTRY CONGRESS....160

Proceedings

OF THE

SEVENTH SOUTHERN FORESTRY CONGRESS

HELD AT LITTLE ROCK, ARKANSAS

JANUARY 19-22, 1925

The Seventh Southern Forestry Congress was called to order by President J. S. Holmes in the Auditorium of the Hotel Marion, Little Rock, Arkansas at 9:30 a. m., Monday, January 19, 1925.

After a brief invocation by Rev. C. B. Waller, D.D., of Little Rock, the Congress was welcomed to Arkansas by Gov. Tom J. Terral.

ADDRESS OF WELCOME

By GOVERNOR TERRAL

MR. PRESIDENT, AND DELEGATES OF THE SOUTHERN FORESTRY CONGRESS:

It is my pleasure to welcome you to Little Rock, in the State of Arkansas. I am interested very much indeed in the conservation of the State's natural resources, among which is its great timber resource. What we in Arkansas desire to do is to make progress along all such lines of effort, and as Governor of this State I am for you, and I expect to back any bill that will help protect our forests. You introduce your bill and I will get behind it. What we want is definite results. You can expect me, good friends, to stand up and give to Arkansas a constructive business administration in the affairs of the State, as well as my heartiest support in putting through a measure which will conserve and protect the forest resources.

My friends, you have assembled here for a definite purpose, you have assembled here to get and give service, and let me say again I am back of you, for I realize fully that if any one thing in Arkansas is needed it is a definite forestry program. I have told Dr. Millar, a distinguished citizen of this state, and Secretary of the Honorary Arkansas Forestry Commission, to bring me a forestry bill, one which means something for the people and to the people and I will back the proposition to the very limit, fighting for the protection of Arkansas' forests.

In welcoming this body of great men to Arkansas, it is not necessary for me to say that we have a great State, one of which we are proud.

It is not necessary for me to state that Arkansas has bountiful natural resources, including the only diamond mine in the United States. It would be useless for me to rehearse that Arkansas stands high in the production of food supplies, and is a great timber state. We have long been one of the nation's chief producers of pine and hardwood timber, and we hope to continue as such for many years to come. In order to do so, we must have a system of standards for proper cutting and utilization. I was elected on a platform of stopping waste and I consider waste of our natural resources, prominent among which is timber, about the most serious waste we have.

I am well acquainted with the men in Arkansas who have worked hardest for the principles expounded by the Southern Forestry Congress. My opinion of them is so high that I will accept from them, without question, any bill for reforestation or protection of our forests, and will put the whole force of my administration behind it.

Arkansas is making progress at rapid strides. It is my whole heart's desire to make the State in all respects a better one in which to live, and it is my desire to give to this great sovereignty an honest business administration, not an oratorical administration composed of making brave promises, but one which will accomplish things for the people of this great State.

Now I am busy, those who live in Little Rock, and throughout the State know I have a problem to fight out. They who know something of Ex-Governor Lowden's problems and administration in the State of Illinois, know the kind of administration I am desirous of giving Arkansas, that being one of service. In closing I repeat what I stated a while ago, I am back of your proposition to the very limit, I will fight for the Protection of Arkansas' forests. Dr. Millar and gentlemen of the Southern Forestry Congress, I will fight with you to the end.

Mr. W. D. Tyler of the Clinchfield Coal Corporation, Dante, Va., and a former president of the Congress responded to the Address of Welcome as follows:

GENTLEMEN OF THE SOUTHERN FORESTRY CONGRESS:

It is possibly peculiarly fitting that the duty has been placed upon me of responding to a welcome to Arkansas. Up to about a week ago I had not put my foot in Arkansas, and during the week just passed, I have been roaming around, trying to get a little of the much needed rest, and learning something of the State. I have been over to Hot Springs, with an old college friend of mine and seeing through his glasses, and under his direction, I have formed a very good opinion of at least a corner of Arkansas. Yesterday morning I happened to be out driving with others, in the country from Hot Springs on a breakfast party, and I was particularly struck with the forest situation around Hot Springs. While we have the same situation in the State of West Virginia, and even Mr. Holmes will have to acknowledge a situation similar in North Carolina, I was impressed with the fact that Arkansas is interested in its forests and am now delighted to have heard from the Governor of this State such an emphatic expression of opinion as to his view on that subject.

As Mr. Holmes has said, the Southern Forestry Congress has been roaming over the Southeastern United States since 1916, holding meetings. We have been welcomed by the Governors of many of the States at these meetings; we have been welcomed by finished orators, in some instances, but this is the first time I have heard any Governor at any of our meetings express himself with such absolute frankness and steadfast support as came from the Governor of Arkansas. I sincerely hope that the legislators of this State to whom he is appealing, will see this situation through his eyes, and will endeavor to get results; that the waste places of Arkansas will not become blossom fields, but will become great tracts of young, vigorous growing trees to take the place of those that are gone.

PUBLIC OWNERSHIP OF FORESTS

PRESIDENT J. S. HOLMES

STATE FORESTER OF NORTH CAROLINA

We have met here at a critical period in the history of our forests and forest industries. The transition is now well advanced from old growth mature timber, timber grown almost without cost to the land owner, to the new conditions when timber will be grown as other crops, with costs for seeding, thinning, protection and other overhead charges. We shall have completed the change before we realize it. Even here in Arkansas, where I was expecting to find one of the few remaining stands of the old hardwoods, I am told that only 12 per cent of the virgin timber remains uncut. Our future protective policy will no longer emphasize the protection of the old timber, but of the young seedlings and saplings. We, by our presence here, show that we recognize the situation. We are here to take council and lay plans for growing the crop which should make unnecessary the long trip and consequent high freight bill for lumber ships from the Pacific coast through the Panama Canal to New York, or the even more expensive rail trip across the continent.

Twenty-five years ago with the establishment of the National Forests in the West, and ten years later by the passage of the Weeks Law, the Federal Government took a lead in working out a forest policy which it has continued to maintain. The Weeks Law has made a good beginning in the acquisition of forest lands on the headwaters of streams to be held as National Forests chiefly for stream protection, and it has thoroughly established the policy of coöperation with the States in forest fire protection. This law has been the greatest single agency in bringing forestry to the place it has reached today in this country.

We have recently passed through years of struggle between proposed Federal regulation and State guidance. We have chosen the latter in securing the enactment of the Clarke-McNary Law. This measure, like the Weeks Law, recognizes the prevention of fire as the basis of practical forestry by authorizing a large increase in appropriation for coöperation with the States in this work. Unfortunately our economical Congress, backed by a still more economical Budget, is allowing for the coming fiscal year only a small increase in this appropriation over that of the present year. Instead, however, of confining assistance to that one forestry measure, even though it be one of supreme importance, it has included several other measures of scarcely less importance.

To briefly summarize its other features, it goes to the root of the forest taxation question by offering coöperation with one or more States in a fundamental study of the tax situation relating to forest lands. A good deal has been said and written about reforming tax methods and about just methods of taxation, but we seem as far as ever from arriving at a solution which will be satisfactory and fair to all parties. This matter must be approached not only from the view-point of the forest land owner, but also keeping in mind the fact that local and State revenues must be maintained and increased and fairness shown to all parties. It is to be hoped that sufficient funds will be quickly available to begin at least one State Study. This matter, however, will be discussed a little later in the session.

The assistance offered under the Clarke-McNary Law to States in the growing and distribution of forest planting material emphasizes the importance of this branch of foresty, which in some States is the leading feature of a forestry program and in all is of far reaching importance, not only for the actual encouragement in growing timber but for its educational value in the effort to prevent fires and secure the interest of the public in the forestry program. The appropriation proposed is pitifully small, but undoubtedly can be raised as the demand for help is increased.

The advice and assistance to farmers owning forest land provided under Section 5 of this measure emphasizes the importance of interesting the small land owners and furnishing them expert yet practical advice on improving their farm woodlands. This has been a practice in all States which have done anything in forestry, but it is well to emphasize the duty of the States by such a measure. In this case as in the preceding one, it is not the size of the appropriation but the emphasis on this feature and consequent stimulation of the work which will accomplish results. The plan to deprive the State Forestry Departments of this work and give it over entirely to the Agricultural Extension Service seems hardly fair to the States which have been building up this work for many years.

The various features of the Clarke-McNary program just enumerated and their application to the forest lands of the South will be taken up more or less thoroughly in subsequent discussions here. I will, therefore, direct your attention for a few minutes to a very important feature of forestry, which at the present, we are apt to think of as rather apart from a practical program, namely, the public ownership of forests. By this I do not mean an occasional area of a few hundred acreas devoted here and there to a city water supply or a State Park, but I refer to a large and comprehensive program for the gradual, but not too gradual, acquisition by the public of lands not adapted to agricultural use.

In order to stabilize the annual production of material essential to our industries and to insure proper protection to streams which are valuable for domestic water supplies, waterpowers and navigation, it has always seemed necessary for governments, either National, State or local, to own and administer a considerable proportion of the absolute forest land of the country, i.e., that not fit for a more remunerative use. In some of the leading European countries for example the percentage of publicly owned forest land is as follows:

France	35	Switzerland	72
Germany	53	Austria	35
Sweden	24	Russia	67

or an average of 50 per cent or more. In addition to this a percentage of the privately owned land, especially that valuable for stream protection, is subject to some kind of government regulation in order to prevent devastation. But this is not only an old world practice. Ninety-three per cent of the forests of Canada belong to the State while the forests of Mexico, Central America, and South America, are all largely in public ownership. While 21 per cent of forests in the United States are owned by the public, this ownership is almost entirely in the West and is far removed from our eastern markets and the great majority of our people. It seems to me that perhaps we have been looking at the tax burden problem from the wrong angle and that at least part of it really is an ownership problem. Our eastern forest lands have in the process of settlement been given away to any who would ask for them. It would have been fairly easy to have prevented the dissipation of this National treasure house, as has been done in Canada, the Phillipines, India, and the republics to the south of us, but to return this land, after being denuded of its timber, its only marketable asset, is a slow and expensive yet quite likely a necessary process.

As a beginning the American Forestry Association in 1901 asked Congress to make an appropriation for the purpose of buying lands on the head-waters of streams in the White Mountains and Southern Appalachians. After ten continuous years of effort the Weeks Law was enacted, and now after fourteen years of operation under this law the Government owns little more than three million acres of forested lands out of a total forested area in the eastern United States of something like 400,000,000 acres; less than one per cent of the forest area, though the west with half of this forest area has 75 per cent of it in public ownership. Are we prepared to accept forever an ever increasing toll for freight on Pacific Coast lumber? A sustained effort is now being launched by the same association to put the acquisition policy on a saner and more enlarged basis. It seems to me that a Government which can spend hundreds of millions annually on battleships, which are scrapped within a few years, could well afford to spend money on forests which will bring in a perpetual return and will forever be retained as a public asset. I am very glad to say that an official of the American Forestry Association is here and will a little later present this matter to the Congress.

This leads me to go somewhat further. There is a growing feeling throughout the east that the States can exercise this privilege of buying and holding forest land as well as the Federal Government. Some go as far as saying that the State only and not the Federal authorities should own and control such lands within the States. It is my own opinion that there is no immediate danger of having too much of our forest land publicly owned, certainly not in the east where it has to be purchased at market price. We are constantly advocating intensive forest protection and other activities looking towards a larger production of timber and a greater helpfulness of the forests to the public. This all costs money and it has been a question as to whether the owner of poor land, say land worth in the open market less than $5. or even up to $10. per acre, can meet all the costs of ownership and management and receive any profit.

The rather recent public movement throughout the country for forests devoted to recreation and aesthetic pleasure is just now centered upon National Parks; chiefly, I believe on account of the advertising value, and therefore, the money value of the name itself. To my mind large eastern National Parks held and administered as the large western parks, of which the American people are so proud, have only a small place in the scheme of public forest ownership. National Forests can supply all the advantages of National Parks except the name and in addition their administration is so elastic that different areas having different values for public use can be adapted to their special use. Certain areas can be devoted to scenery, to recreation, to the preservation of plant and animal life, as well as more economic uses of supplying water power, city water supplies and timber supplies for local and more distant industries. The Government is already buying land for National Forests, and the Constitutional and Legislative difficulties are behind us; whereas no Government money has been used for the purchase of National Parks and some claim that Congress cannot grant that power.

State Forests do not have the same advantage over State Parks, which National Forests seem to have over National Parks because the administration of State Parks varies to a much greater degree. However, the recreational feature is the chief one in State Parks whereas it is only one of the several uses for State Forests, though there is a growing tendency to emphasize recreation to a still greater extent in State Forests. This is in line with the object of public ownership, namely, the greatest use of the Forests to the people concerned, and whether State land is held as Forests or as Parks the greatest possible use should be made of it by the public.

The people of the various States are going at this problem in a number of different ways. Some are contemplating large programs of acquisition for State Forests. Two years ago Colonel Joseph Hyde Pratt, at a meeting of the North Carolina Forestry Association, urged a plan for purchasing 300,000 acres of land scattered throughout the State, an average of 3,000 acres a county, at an estimated cost of one and one-half million dollars. He figured that the State could well afford to issue bonds for this amount for this purpose, calculating that in 50 years time with interest, maintenance and protection charges on the land, the States would have spent $6,000,000. At that time he figured that the timber alone would be worth anywhere from 12 to 22 million dollars, leaving a net profit to the State of from six to sixteen million dollars. He is an idealist and the idealist looks further into the future than the common man, so that this has not yet been tried. The rest of us, even if we have not the vision, can have faith and follow on behind. There is another idealist in Pennsylvania, the chief executive of action as well as of vision, and that State is proposing a bond issue of $20,000,000 for the purpose of adding to their more than 100,000,000 acres of State Forests. Nearly all States having forestry laws encourage the purchase of forest land for this purpose and already 23 States including Pennsylvania own about six and one-half million acres of land as State Forests. The chief difficulty so far has been in getting the money to buy or the generous owner to give lands for this purpose.

But public ownership does not stop here. It has been carried into our county, township, and city Governments. The Massachusetts Forestry Association has been doing a big service through its program to secure a "town" or township forest in every township in the State. Let me quote from a recent report issued by this Association: "For ten years the Massachusetts Forestry Association has published bulletins and special article on the advantages of town forests. Scores of editorials on the subject have appeared in the press and hundreds of columns have been devoted to it. Thousands of citizens have heard lectures on forestry in which the value of the town forest was emphasized. The most effective argument of all, however, is the record of the towns that have established or voted to establish such forests. Of these 41 municipalities, 29 have appropriated $25,372.00 or $875.00 per town; 36 have set aside 3,454 acres or 96 acres per town; 28 have planted 464,500 trees or 16,600 trees per town. There are 107 other towns that have appointed official committees to report on the subject at the next town meeting. In other words over 40 per cent of our cities and towns have taken some action toward the creation of Town Forests." This shows what a real live Association can do through interesting the people in forestry. Again in Connecticut the State Forestry Association has recently succeeded in purchasing what it calls the People's Forest through public subscription.

Here allow me to digress long enough to emphasize the value of a State Forestry Association, whether the State has secured a Forestry Department or not. Having been connected with such an Association for 14 years, I can speak with some measure of experience. Although the results often seem small or altogether lacking, and although in some cases the State Forestry officials have to do a large part of the work, the common interest of even the few faithful men and women continues from year to year as a very decided and helpful effect on the public opinion of the State. The ideal Forestry Association is one entirely separated from the State Forestry Department, for it wields a much larger influence upon the public and the legislature than one maintained under the guidance of a State employee. So far as I know the Massachusetts Forestry Association mentioned above is the only organization of the kind with a full-time paid secretary. One or two others have a secretary paid part-time but most or all of the Associations especially in the South pay their officials nothing. This is a great handicap to their effectiveness but is a sad necessity. I do want to emphasize the fact, however, that every State in the South should have a Forestry Association and that all the people interested in Forestry and Forest Fire Prevention should make a point of supporting that Association.

In my own State of North Carolina there are now some 25,000 acres of forest land owned and protected by the municipalities of 20 or more of our mountain towns for the purpose of protecting their water supplies, and this total is gradually being increased. Undoubtedly the same conditions hold in many other States. These areas are held as necessary parts of the city water systems, and as a rule no other use of the land is permitted. The city of Asheville bases a large part of its popularity on its pure water supply and it considers its 18,000 acre watershed as not merely a profitable but an essential investment.

The value of public forests for education, as well as for recreation and commercial use, must be emphasized. This is being done in the most recent proposition in the South. The establishment of a Community Forest by the city of Savannah was suggested at our last Forestry Congress. This idea seems to be taking shape. Plans are under way to secure a considerable area of forest land not far from the city so that the citizens could use it freely and often for all legitimate recreation. The larger part of it would be used to grow timber and probably the timber sold at a suitable time and the area reforested according to the approved plans. In this way the people of the city would learn what forestry was and the advantages of better forest practice. It is maintained that "A well located tract of land purchased cheaply and set aside for natural reforestation would be a good investment in two ways: first, it would pay as a source of timber for pulp wood or fuel, of naval stores and other forest products. The second (and perhaps it is the greatest) value might come from making this an experiment reservation and carrying on various experiments in planting, natural reforestation, protection from fire and hogs, etc." The advantage of such an object lesson owned by the people themselves would be incalculable.

In advocating public ownership we are, I think apt to magnify the first cost. This is a mistake because in practically every case lands are not likely to decrease in value so will eventually become probably the most visible asset which the State can show for its annual expenditures. I feel that this Congress would make no mistake in emphasizing along with its policy of Forest Fire Prevention this companion policy of public ownership of the poorer forest lands.

REPORT OF THE TREASURER

RECEIPTS

Balance from former Secretary	$ 408.05
Donations from individuals, firms and Associations	
Alabama	$ 115.00
Florida	308.04
Louisiana	200.00
Maryland	10.00
Missouri (to Chairman Finance Committee)	95.00
Tennessee	50.00
Virginia	75.00
West Virginia	10.00
	$1,271.09

DISBURSEMENTS

Stationery, 1924	$27.25	
Stationery, 1925	50.00	
Directory, by former Secretary	2.11	
Stenographic work and postage	10.00	
		$ 89.36
Balance on Hand, August 15, 1925		$1,181.73

C. B. HARMAN, *Secty.-Treas.*

The President announced the following committee:

Resolutions Committee—W. D. Tyler, E. W. Gates, Page S. Bunker, D. V. Dierks, Frederick Dunlap, Mrs. Florence H. Stone, O. O. Axley, Dr. A. C. Millar, T. C. Rosbrough, George

Vaughan, E. Murray Bruner, J. B. Woods, W. L. E. Barnett, J. G. Peters, Goodrich Jones.

Committee on Nominations—E. O. Siecke, H. E. Hardtner, Chapin Jones, W. L. Hall, C. A. Plymale.

Committee on Place of Meeting—Dr. Herman Von Schrenk, James Boyd, W. D. Tyler, Eugene Baker, W. L. E. Barnett.

"WHAT PRACTICAL FORESTRY CAN DO FOR ARKANSAS"

By J. R. HAMLEN

CHAIRMAN, HONORARY ARKANSAS FORESTRY COMMITTEE

When Mr. Roosevelt was President, we often heard, many of us for the first time, the phrase "Conservation of Natural Resources." I wonder, how many of us then appreciated the profound sense of that appeal. We knew in a general way what the words meant, but only a few of us, then or since, went further and attempted to apply the force of a conservation policy to our own immediate and pressing requirements.

The result finds Arkansas, today, at the threshold of one of her most vital problems, which unless solved, is quite likely to produce effects of a far reaching character upon her commercial future. I refer, of course, to the alarming shortage of our timber supplies and the necessity of replenishing them—a task, the immense importance of which cannot be over-estimated.

It is hardly necessary to mention the reasons for this shortage. It is sufficient to say, that reckless cutting, without foresight in days gone by, and in a sense of lavishness which indicated a never-ending supply of timber, is one of them. A prodigality of carelessness towards the ever-present dangers of forest fires, is another. And the continued destruction of forests without any fixed thought or plan of replanting them, is still another.

Tardy, however, as we have been to recognize the pending consequences of this short-sighted policy, there is still opportunity left to us, to make amends and prevent a death blow to an ancient, honorable and profitable industry. But those of us, who now realize the dangers of a complete obliteration of our forests and of the problems which confront us, are not able by ourselves, alone, to solve them. It is far too large a task to accomplish without the combined influences of all our agencies —professional, industrial and political alike, within the State.

Therefore, I desire to call upon the legislature, now fortunately in session, and also the citizens of Arkansas, to combine their forces and help us fix upon a policy and enact effective legislation which will ultimately do more for the State than anything I now have in mind. The Honorary Arkansas Forestry Commission, which was appointed some time ago by Governor McRae, has submitted after careful consideration, a Forestry Bill, simple in language, but powerful in intent and we hope the present General Assembly will promptly pass it and thereby make the first step towards permanent forestry relief.

So far, Arkansas has done practically nothing as a State to protect, preserve or perpetuate its forests. It hasn't even a State Fire Warden. And yet information gathered officially by the United States Forest Service shows that 2137 fires occured in 1923, and were reported to the Forest Service in Washington. These fires burned over 675,000 acres of standing timber with a damage of three quarters of a million dollars. I am told that these figures do not anywhere nearly represent the total number of fires that occured in the State that year, or the total burned acreage or damage thereto.

Thirty-five States out of the forty-eight have enacted some sort of forestry legislation creating State forestry bureaus or departments and most of these States are coöperating with the Federal Government in fire contol work. Until Arkansas follows suit, adequately, she is not permitted by law to benefit from the use of Federal aid, as provided under the Weeks' Law for fire prevention.

I have been asked to briefly discuss "What Forestry Can Do for Arkansas." Perhaps I may best answer this question by stating how Arkansas will suffer if nothing is now done to stem the tide of complete timber shortage.

There are an endless number of purely economic reasons why we should fortify our present timber supply and prevent further waste of it. The lumber industry of Arkansas has greatly added to her prosperity and the ratio of increase or decrease of this industry, in the future, will affect the welfare of the State in the same proportion. Forest products enter into almost every one of our economic agencies. Even American standards of living have developed upon abundant timber supplies and the relatively low prices thereof.

The cut-over timberlands in many parts of our state are only fit for reforestation. The land area of Arkansas may be roughly estimated at 33,000,000 acres. Only 27% of this vast expanse is "improved," by which I mean, fully or partly cultivated with a larger proportion only partially used for crops.

During the 10 years between 1910 and 1920, the population of the State increased 11%, but during the same period, the farm land area increased only one-tenth of one percent or 40,000 acres. In other words, the farmers of the State are not turning her soil into crop cultivation nearly as fast as they should in order to keep pace with her increasing population. It is a debateable question whether this inequality will ever materially change. But as I see it, the plain inference is that other means should be found—in fact, must be found, for the use of her great uncultivated area and for what is infinitely more important still, the continued maintenance of her prosperity.

The farmers of Arkansas who naturally make the largest part of her population and who will surely suffer or prosper, in proportion to the degree of productivity of their lands, have failed so far, undoubtedly due to educational neglect, to understand the importance of the earning capacity of timber growth upon their lands. This is an alarming situation for them to be in. If our forests are to be cut without replenishment, what is to prevent a great industrial depression in sections of the State which now depend almost wholly upon timber operations? Is there any other comparable activity suitable for quick and successful substitution? I know of none.

The commercial success of the regrowth of the softer species of timber in Arkansas has been assured by practical experience. Reforestation is being actively carried on by certain lumber companies in the State. They have realized the necessity of doing something to protect their interests. There are hundreds of thousands of acres of land in Arkansas, which are only suited for timber growth, and which, if administered properly, may be made an agency for producing inestimable wealth for years to come.

Other States in the Union have recently become aware of this great problem which confronts them. They are showing their interest in a practical manner. For instance, in 1923, New York State appropriated over a million dollars for forestry purposes alone. Pennsylvania appropriated $860,000, Louisiana, $60,000, and Texas, $40,000. New York State has set herself to the task of making her forest lands grow enough trees to meet her needs in lumber. This is exactly what Arkansas should do.

Lumber production in Arkansas reached its peak in 1909. Up to that time, the production had steadily increased. Since then, it has steadily decreased. This falling off in cut has by no means been due to a decrease in the demand for our timber, but has been due solely to a decrease in our timber supply. The production of lumber in this State has decreased 31%, or practically one-third, in the eleven years from 1909 to 1920. If the same rate of decrease holds good in the future, we may readily fix almost a definite day, when our timber supply will be merely a matter of ancient history.

The original forest cover of Arkansas appears to have been about 250 billion feet distributed over approximately 30,000,000 acres. By 1920 the States total stand of merchantable timber had been reduced to about 44 billion feet of hardwoods and 16 billion feet of pine, or a total of 60 billion board feet, spreading over substantially 21,000,000 acres.

The great pine lands of all the South have decreased from 130,000,000 acres to about 23,500,000 acres. The United States Forest Service tells us that the present rate of timber consumption throughout the country, including loss by fire and other destructive agencies, is nearly four times greater than the timber growth.

The value of the products of timber is only exceeded by the value of the products of the farm in Arkansas. No other single industry within the State, in which the wages paid for labor is a very considerable item, compares in value to the manufacturing of our forest products.

There are at present 1500 establishments in the State, manufacturing lumber and other wood products, the value of the annual output of which amounts to something approaching one hundred millions of dollars. Is not the perpetuation and protection of this collosal industry of tremendous concern to the counties where these plants are located, and to the countless number of people who are either directly or indirectly dependent upon them for a livelihood? In many counties the revenues for government, including funds for all kinds of improvements, are almost entirely derived from forest resources. What will happen when there are no such resources available?

The farmers of the country use about one half of all lumber consumed, annually. From reliable Forest Service statistics, there are over seventeen million acres of Arkansas land in the hands of its farmers. Nearly half or eight million acres are actually woodlands.

If properly cared for, by which I mean protecting these woodlands from fire, cutting the larger trees and keeping the smaller ones until they reach their full stature in size and value, these eight millions of acres owned by the farmers should produce each year, in the neighborhood of a billion board feet of forest products. Even without intensive administration, nearly eight billion dollars worth of products of the forest were sold from 26,000 farms in 1919 or an average per farm of $290, a very tidy sum.

Any forestry program for Arkansas should, therefore, make the amplest provisions for the care of this potential investment, owned by the farmers of the state.

Much of what I have said in this brief address, will be "ancient philosophy" to the members of the Southern Forestry Congress, here present. I hope, therefore, I have not bored you too much with our own local problems. My appeal is perhaps more for home consumption than to make my paper interesting to those, who by very reason of the fact that they are here at this meeting, give evidence that they are sympathetic toward our forestry situation.

In behalf of the Honorary Arkansas Forestry Commission and the Arkansas Forestry Association, I want to thank you for the tribute you have paid us by selecting Little Rock for your annual meeting. From your interesting deliberations, much help will be given us. And from your stimulating influence and knowledge of the subjects under discussion, a direct path will, I am sure, lead to forestry relief for us.

INITIAL STEPS IN STATE FORESTRY LEGISLATION

By J. G. PETERS
U. S. FOREST SERVICE

Generally speaking, the adoption of legislation by the States depends both upon the kind of legislation, or the specific legal remedy which the legislature is asked to consider, and in large measure upon the legislature's belief that not only is the proposed legislation desirable, but really wanted by the public, or "the people back home." Other things being equal, and leaving out of consideration the extent to which politics or personalities might affect the result, experience has demonstrated that legislation in its initial stages will receive the most favorable consideration if kept brief and simple and direct. Especially is this true as to forestry, an entirely new subject to many people. The public in many sections knows little about forestry, knows little about the serious economic consequences of the destructive practices in handling our timber supply and the lack of protection afforded our forest lands. Our people are generally ignorant of the subject, and do not realize the value of the forest and that it is worth protecting.

The purpose of forestry legislation is to provide the necessary means for growing timber. For the individual State, the aim is to grow at least enough timber to meet the State's needs. This will be achieved primarily by making it possible for private owners to grow timber at a profit. Private owners are beginning to consider forestry as a business proposition for no other reason than that they think it will pay. State forestry legislation, therefore, should be designed with a view to protecting the private owner in the legitimate pursuit of timber growing and to aiding him and coöperating with him through justifiable means in making the undertaking profitable.

For States such as many in the South which are just undertaking or are about to undertake forestry work, it seems to me that legislation should have two main objectives: Education and protection.

Education is basic, for unless the public is given the necessary information that will cause it to realize the value of the various uses to which the forest and its products can be put, there is small hope of securing within a reasonable period the protective measures essential to the production of timber crops. The public, in fact the owners of forest land themselves, must be made to see the potential values of that which they are asked to protect before it can be expected that the necessary funds will be forthcoming for protecting it. The process of educating the public in forestry matters is a long one, requiring painstaking and laborious effort. The educational campaign should include not only work of a general nature in the form of publications, lectures, moving pictures, press articles, and the like, but that of special assistance on the ground to private owners in the management and reforestation of their forest lands. The importance and size of the undertaking demand the establishment of an agency designed especially to conduct such an educational campaign. Thirty-two of the States have taken this action. Even those which started the earliest, some as much as forty years ago, find their forestry programs by no means complete and have learned that a constant and extensive campaign of education is necessary to enable them to hold the ground already gained and to make reasonable progress in addition.

Legislation is only a means to an end; it is not an end in itself. A law prescribes that something shall be done and sets up the agency for doing it, if one does not already exist. No matter how wise or how inherently beneficial a law may be, it is practically a dead letter if the agency fails to function either through inefficiency or lack of funds. In order, therefore, that a law may be executed effectively, its administration must be entrusted to competent hands, and funds must be made available which are commensurate with the importance of the work authorized. The matter of administration is fundamental; it is the starting point.

What is the best form of administration for conducting forestry work in the most effective manner,—to keep it free from politics and partisanship, to see that it receives the necessary helpful direction, and to expend the funds in accordance with sound business practices? The States have organized their forestry work along two broad lines, either separately, under a special board or commission, or in combination with more or less kindred activities, all under the direction of a coördinating head. There is an undoubted trend toward the combination form of organization, on the ground chiefly that it means a reduction in the number of State departments, which results, it is claimed, in bringing the head of the State Government, the Governor, into closer contact with the several State activities, and in greater economy in administration. The theory of the combination form is to keep the number of departments into which the State government might be divided to a minimum, each under the charge of a business or technical head directly responsible to the Governor, who in the final analysis is responsible to the people for the character of administration which the State receives. Where the appointees over such departments are restricted to persons with the proper and necessary business or technical qualifications, the results are for the most part satisfactory, that is, efficient and economical administration is secured, with added prestige and the ability to obtain adequate recognition from the legislature. Where, on the other hand, appointments are made for purely political or personal reasons with small regard for the essential qualifications, it can very readily be seen to what extent the administration of the department might suffer and the efficiency be lowered.

On the whole, I think, experience has demonstrated that the most satisfactory form of organization for a State just undertaking forestry work is a separate board or commission with as nearly as possible a non-political and non-partisan membership. The State, which represents the public, should have membership on such a board, and the several private interests in the State concerned with forestry, such as lumbering, farming, turpentining, and the like, have an unquestioned right to a voice in the formulation of the State's forestry policy. Such a board then would be composed of certain State officials as ex officio members, preferably officials whose activities are connected with or have an important bearing upon the State's forest resources, and of representatives from organizations or industries which have a private interest in the forest and its resources. An ideal arrangement for having the private interests represented is for the organized associations of such interests, where they exist, to nominate for membership on the board a member from each association who would receive his appointment to the board or commission from the Governor.

In order that the board might be removed as far as possible from politics, some of the States have found it desirable that the majority membership should be selected from the private interests, and that the terms of office of such members should be so arranged that only one would expire each year leaving the remaining appointees as an experienced nucleus. I have never heard any valid objection, other than a State's constitutional limitations, against appointees to such a board from the private interests concerned. Objection has been raised to ex officio members, other than the Governor himself, on the ground chiefly that they are as a rule officials coördinate with the State Forester, whom the board would be authorized to appoint, and that it is undesirable for a coördinate official as a member of what practically amounts to a board of directors to supervise the duties of the State Forester.

The job of a protective system is to prevent and suppress forest fires. How should it begin, and what legislative provisions are necessary in the initial stages of the development of protection are questions that deserve careful and practical consideration. Let us keep before us the objective of growing timber. Protection is the chief avenue for making this possible. It will succeed best if the public knows what is being done and feels that the cost is justified. A large part of protection, therefore, is necessarily educational in character. Especially is this so in the early stages. I believe that it is preferable to confine State-wide effort in protection in the beginning to education almost exclusively. On individual areas, such as the National Forests and any private tracts which have received special protection, the development of protection beyond education and into other phases, notably prosecution for violation of fire laws, may be justified. The work of a State as a whole, however, is most effective at first if limited to that which local patrolmen, rangers, wardens, and the like can do in convincing the public of the desirability from the economic standpoint of putting an end to the promiscuous burning of the woods, preventing fires due to other causes, and extinguishing fires that start. The only necessary legislative provision, therefore, to conduct this work is blanket authority to the State forestry department to adopt such measures in the prevention and suppression of forest fires as may be reasonable and practicable. Such general provisions will be found, for example, in the Texas and Alabama laws, and these, I think, have proved satisfactory, the former over a period of nearly ten years, in the development of fire protection in these States. In my judgment, it is a mistake in the beginning to propose lengthy and complicated legislative provisions that will set up a system of local wardens and fire fighters, the purpose and intent of which can very easily be misunderstood by the members of the legislature, in fact have been so misunderstood and have caused the defeat of protective legislation in numerous instances. A brief and simple provision, therefore, which will enable the State forestry department to adopt the system of organization that best meets the State's local conditions for educating the public in the prevention and suppression of forest fires is in my opinion all that is necessary as a first step.

By no means the least important question for consideration in the initial steps of State forestry legislation is that of financing the work of the forestry department. As in financing other State activities, the customary method is to appropriate funds from the general treasury. Most of the States follow this plan. There are, however, several interesting exceptions that have been devised, in some instances to avoid drawing on the general fund and in others, to require private forest owners to share a part of the cost. The latter takes the form of special taxes. Some States have adopted both methods. Thus, Maine derives the larger part of its forestry moneys from a tax on the extensive forest holdings in the northern part of the State for protection purposes exclusively, and makes a general appropriation for protecting the more open forest areas in southern Maine and for other purposes; New Hampshire, Washington, and Oregon, not only make appropriations from their general funds but in addition require private forest owners to expend for the protection of their holdings up to a specified sum per acre. Louisiana, a number of years ago, initiated a severance license tax on timber and other forest products for the express purpose of supporting a forestry department, one of whose functions would be to protect the forest lands of the industries which pay the tax. Unfortunately, this expressed intent was set aside, with the result that only about 15 per cent of the severance license tax on timber and other forest products is now devoted to forestry work by Louisiana. Another Southern State, Alabama, has adopted the method of using for the support of forestry work the privilege or occupational taxes collected from establishments manufacturing lumber and other forest products. Such taxes had already been imposed by Alabama for a number of years so that what the legislature did was merely to provide for transferring the amounts thus collected from the general fund to a special forestry fund. It can, therefore, be seen that the question of financing forestry work is distinctly a local one for the State itself to decide.

The foregoing are briefly my ideas of the essential first steps in State forestry legislation. They deal only with such activities as the States which have undertaken forestry work have found through experience they could handle most advantageously at the start. Conspicuous by their omission are such important phases of forestry as investigations, the acquision of State Forests, and modification of the procedure of taxing forest properties. Enough already is known without further investigation to enable a State to begin the formulation of its forestry policy on a sound basis. State Forests are not important at the start and come, as a rule, only as a later development in the State's forest policy. Forest taxation is distinctly a subject for further investigation either by individual States or groups of States. Provisions for these and other special phases of forestry can well be deferred for future consideration in the interest of keeping the initial legislation brief and simple, and limiting it to essentials only.

The adoption of these first essentials will enable a State to receive the benefits from the coöperative provisions of the recently enacted Federal forestry law known as the Clarke-McNary Act. It may interest those of you who are not familiar with this law to know that it authorizes three appropriations to be expended yearly in coöperation with the States:

(1) $2,500,000 for the prevention and suppression of forest fires, a small portion of which may be used for studies of forest taxation and timber insurance.

(2) $100,000 for the distribution of young trees for planting on the farms, and

(3) $100,000 for assistance to farmers in the management of their forest lands.

Before concluding, may I ask you to turn your attention for a moment to what the States have done in forestry? Beginning in a very limited way 40 years ago and confining their effort merely to educational and investigative activities, State forestry departments have increased and developed beyond the most optimistic hopes of the followers of their remarkable progress. Today there are 32 States having forestry departments, in addition to several which, without waiting for their legislatures to establish a special department, have inaugurated forestry work at their agricultural colleges and appointed extension specialists in forestry. The combined appropriation for the present year made by the States for forestry, which is a practical measure of its progress in the States, is $5,500,000 divided about equally between forest protection and the purchase and maintenance of State Forests, forest nurseries, and reforestation work. Twenty-nine States have protective systems for the prevention and suppression of forest fires, and receive allotments from the Federal coöperative fund of $400,000 for the current year. Twenty States have established State Forests, with a total area of five and three-quarter million acres, and 15 States have forest nurseries which grow small trees for distribution to farmers and other forest owners. Ten States have modified their taxation procedure so as to defer the tax on young forests until the timber is mature and cut. Most of the State forestry departments offer assistance to private owners in the management of their forest lands, and all of them carry on educational and publicity work of a general forestry nature.

The development of forestry in the States that have made the most progress is the result of effort throughout a period of years, during which their activities have been built up from small beginnings, their legislation revised and added to, and in some instances their entire basic structure of forestry changed. The States which have yet to undertake forestry work, including no less than seven of the States covered by the Southern Forestry Congress, can learn their lesson from the experience of these States, which undoubtedly is to begin on a sound basis, with a simple and not too ambitious program.

In summarizing, then, experience in State forestry indicates that in the beginning the States will build the soundest and make the most satisfactory progress if they will limit their activities to those of an educational and protective nature, and shape their legislation accordingly, so as to provide for—

(1) A State forestry department,

(2) A State Forester,

(3) An educational campaign, including assistance to private owners in the reforestation and management of their forest lands, and

(4) A system for the prevention and suppression of forest fires.

THE ORGANIZATION OF STATE FORESTRY DEPARTMENTS AND FIRE PREVENTIVE SYSTEMS

By PAGE S. BUNKER

STATE FORESTER OF ALABAMA

Organization presupposes varied and specific functions. Thus the organization of a State Forestry Department must be based upon the particular duties with which the department is charged. These duties, of course, are those directly stated in the organic act creating the department and those which by reasonable inference are corollary to the explicit provisions.

To assume a typical case, we may consider that the organic law directs the Forestry Department to:

(1) Investigate forest conditions in the State with reference to all matters pertaining to forestry.
(2) Promote among all classes of the population a proper appreciation of the benefits to be derived from the practice of forestry.
(3) Take such measures as may be reasonable and practicable to protect the forests against fire and other harmful natural agencies.
(4) Afford private owners, as may be practicable, information, advice, demonstration, assistance and coöperation.
(5) Have sole charge of the State's public forestry interests.
(6) Employ a State Forester who shall be the executive officer of the Department, charged with carrying the provisions of the act into effect.

(7) Perform such other duties as may be imposed upon it by law.

The form of the organization, then, must be such as will most readily lend itself to carrying out the stated duties.

If the entire direction is placed in the hands of a single person, the further organization of the department can proceed expeditiously and exactly in accordance with the exigencies of the service as viewed by such officer. On the other hand, in most cases it appears that there are many matters affecting the development of forestry work in the State that hardly lie within purview of any one person, and are best represented through the aggregate familiarity with local conditions of a board or commission which may direct the broad policies of the department. To afford continuity or adaptive transition of the State's forestry policy, the members of such a commission should have overlapping terms of office so that changes in its personnel should be infrequent and only partial at any one time. To avoid cumbersomeness the membership should not be numerically great, five to nine members usually proving most efficient.

It is perhaps needless to say that the members of the Commission should be selected with primary view to their ability to assist in the development of a sound forestry policy, but the authority by which they are appointed should not be restricted in its choice to individuals selected or recommended by particular persons or organizations. If the appointing authority is the Governor, under every proper theory of statehood the chief executive should have freedom of action in impressing his individual policies upon the administration of public affairs during his term of office.

In general, we may say that with the exception of the Governor, and possibly the Lieutenant-Governor, there should be no ex officio members of the Commission. In most of the southern States public forestry is of sufficient economic and civic importance to be given full departmental grade on a par with the other recognized departments of the State. To include on the Commission the executive officer of another department tends in a certain degree to subordinate the Forestry Department to that administered by such ex officio member. Still less should an employee of another department be elevated to membership on the directing Commission of the Forestry Department.

The executive officer of the Commission necessarily must be a professional forester with considerable experience and proven ability in the lines of work indicated above. In addition to this, he should have the faculty of organizing and administering public activities. In view of the importance of records in connection with the work, the State Forester should also serve as Secretary of the Commission.

We may also assume that with reference to each of the duties and powers of the Forestry Department the law has used fairly general terms. This, of course, will permit the more detailed organization to adapt itself to the developments of the work as they occur. It is readily apparent that the specific procedures followed in one State may be inapplicable in another, and it would be a serious error to prescribe a uniform treatment for the problems of all of the States.

The creation of a Commission of Forestry and the employment of a State Forester in conformity with the general procedure indicated in the foregoing are the first steps in organization. The next step is fact finding. Before aggressive work can be scheduled it is necessary to ascertain the forestry needs of the State, the general and local conditions under which measures must be applied, the present and prospective facilities for the application of such measures, the sentiment of the local communities, the geography of the State, the character of the channels by which the public is most effectively reached, the principal components of the fire hazard and its relative intensity both geographical and temporal, principal forest types, the traditions, history and civic conditions of the various sections of the State and numerous other factors of great importance in determining the extent and character of the procedures that may prove feasible in the development of public forestry work. Fact finding along these and similar lines is so important that I place it before all other activities of the department. Any procedure based upon inadequate ascertainment of facts is obviously more or less haphazard in character and more than likely to defeat its own object.

With a working knowledge of local conditions the department may then proceed to divide the work to better carry out the intent of the law. It is at this stage that we must be careful not to commit the error of over specialization. To the inexperienced organizer a ramified system of allocated functions may appear attractive. As students we used to admire the diagrams showing the different departments, branches and offices, with their corresponding interrelations, of a large industrial concern, a railroad circus and an army corps. When we reflect, however, that it would be fatal for a country store to copy Wanamaker methods or for a rural blacksmith shop to adopt the Taylor system, we can readily see that over-organization may have a disastrous effect.

Both in human affairs and in nature, efficient organization has been a matter of development. We may safely follow this rule in the inauguration of State forestry work. Thus in a newly created department we may conceive that the division of labor will be somewhat informal. Later, with the increased demands upon the department there will develop a natural differentiation of functions. Even at this stage, however, a safe rule is to require each professional member of the department not only to know as much as possible regarding his particular duties, but also to know enough about his fellow foresters' work to help out in time of need. This is parallel, within the field of forestry, to the old saw that it is well to know everything of something and something of everything.

After a reasonable amount of preliminary publicity and educational work, State forestry must be carried into the woods. We have spoken of work on the basis of kind. We now have to consider it on the basis of place. The same locality is often in need of various kinds of forestry work. The same landowner may require both assistance and instruction in fire protection, planting and management.

Shall all of these functions be performed by one local forestry employee or by several? Or shall part of them be performed by a local man and others by visiting specialists? Obviously it is to the landowner's interest to encounter no confusion in his relations with the State in connection with his forestry interests. A single local forester may appear the logical solution of such questions. Under present conditions, however, it is very exceptional that persons trained in forestry can be found in many of the local communities. This raises the question as to whether the local man shall be selected from the residents of the community or assigned to the locality from elsewhere. In the South, it may be regarded as a rule that as much of the local work as possible should be done by men selected from among the local residents. This is particularly true in the case of fire protection. The reasons for this are obvious and need not be detailed here.

Local employees will rarely have an advance knowledge of forestry methods in any line. Assuming that they possess good native qualities and a common school education, the next step in the organization of the field service is the instruction, training and development of these men in the simple elements of fire protection, mensuration and utilization. Other phases of elementary forestry should be placed before them as time and opportunity permit.

The development of the local field force ranks next in importance to the fact finding work that I have referred to. In fact, the latter can hardly proceed independently of the former, since the State Forester must depend to a very great extent for his facts upon the reports of the field force. If the members of the latter have not a clear conception of the meaning of an acre, a thousand feet B.M. and other elementary units of computation, their reports as to area and damage covered by forest fires will be valueless. Other considerations of this sort will readily occur to all of us.

By local employees I mean the men in direct contact with the woods and the local public; in other words the man who actually fights the fires, visits the rural schools and is directly responsible for the condition of a certain specified territory, having no paid employees serving under him at any time. In other words, he is the actual point of contact between the State's forestry policy and the forest. Next to the State Forester himself this man is the most important member of the organization, and no pains are too great to spend upon his selection and development.

We are familiar with the so-called stepladder system of field organization whereby the local force is the last term of a geometrical progression starting from the State Forester. Under this system several men are designated, each of whom designates several others who in turn select a number of subordinates and so on down until the local communities are reached. To a student of organization it immediately occurs that the efficiency of such a system must depend chiefly upon good fortune. It is axiomatic that transmission should be as direct as possible and intermediate elements held to a minimum. Under the stepladder system it often is almost impossible to secure dependable information as to actual conditions in the field, and it becomes exceedingly difficult to distinguish between success and failure.

Even in the best organized department, however, there may come a time when there must be intermediaries between the State Forester and the local men. An example of this is the establishment of a branch of forest protection immediately under an assistant chosen on account of long and successful experience in protection work of the kind that he is called upon to supervise. Still later, as the number of districts increases, this specialist may require one or more assistants of his own. However, this latter step should be undertaken only with the greatest caution.

Inspection of the field work is extremely important. As a matter of fact, unless it is carried on quite thoroughly the State Forester is likely to find that his assumed facts are badly awry, and that policies and procedures based upon what were conceived to be actual conditions are comparatively futile. Inspectors should be also chosen on the basis of long and successful experience in doing the kind of work that they are to inspect, under conditions similar to those governing its present performance. Naturally, all inspection work should be undertaken in the spirit of comradeship and friendly coöperation. From these requirements, it will be evident that competent inspectors will be very hard to obtain. Often they will have to be developed from among the members of the local force.

I will say then, that the primary organization of a typical Forestry Department in a southern State may consist of the creation of a Forestry Commission composed of members with overlapping terms which will direct the broad forestry policies of the State, the selection of a competent State Forester by the Commission to serve as its executive officer, the building up of a force of carefully selected local men, close inspection of the work of these men, with formal division of the State's forestry work into distinct branches to follow when clearly necessary. The tendering of paid employment contingent upon the occurrence of forest fires is fundamentally wrong and has but incidental place in a practical protective system. The success of fire protection work must depend chiefly upon the individual effectiveness of the local men and upon volunteer assistance by the residents and landowners of the community.

DEFERRED TAXATION

By HENRY E. HARDTNER
URANIA, LA.

I hesitate to discuss a subject so important, so little understood and yet of such deep significance to all our people as deferred taxation. Tax reforms come slowly because of the indifference of the people towards any changes in accepted policies or customs of years' standing. "Deferred Taxes," "Severance Taxes," "Yield Taxes" are synonymous terms and usually mean taxes levied on a product at time of severance from the soil.* I believe that Louisiana was the first State to attempt this advanced reform in taxation. In 1908 a Conservation Commission was created for the purpose of recommending laws for the conservation of Natural Resources, which at that time was a popular subject due to the wide publicity given through the "White House Conference of Governors" which had been called by President Roosevelt. I was made Chairman and Hon. Harry P. Gamble Secretary of this Commission; and with the assistance of the other members we worked out as best we could, plans that meant the conservation, protection and perpetuation of our State's natural resources.

---

* Looked at from another point of view however the terms "Severance tax" and "Yield tax" are not synonymous. Prof. H. H. Chapman in a letter to the Editor dated October 5, 1925, quotes Prof. Fairchild of Yale on this subject as follows: "He (Prof. Fairchild) says that it has always been his understanding that a severance tax was an additional tax levied on the process of removing natural products from the soil, which is not the same conception that has been advocated by foresters as a yield tax. The true yield tax is a substitution of a tax on yield for an annual tax on property value and not an additional tax. It is true that a severance tax might be based on yield. Whether the one is distinct from the other in practice can only be judged by knowing the circumstances in each case."—*Editor.*

Funds were needed for administrative purposes and as usual the State had no funds to spare. We were told by Gov. Sanders that while our work had his approval we must find the money from some new source, if conservation was to be made effective. Hon. Harry Gamble, a deep thinker and skilled in law presented the Severance Tax plan which was in reality then a "License Tax" on all natural resources severed from the soil, such as oil, gas, timber, salt, sulphur, etc., and this additional tax was to be used only for conservation. An Amendment to the Constitution was necessary before the new laws could be made effective. In time it was found that the severance tax was an ideal revenue producer, just and fair to State and tax payer, especially when applied to taxation of hidden, fugitive and exhaustable resources such as oil, gas, sulphur, salt and in a measure to renewable resources such as timber. The State was not realizing the taxes to which she was entitled from these hidden, exhaustible resources, because it was not possible to levy an ad valorem tax on properties where these resources were supposed to be. The severance tax was then made a lieu tax and was levied on these products when they were mined or brought to the surface. These resources were now visible and subject to the same rate of taxation as other properties—a "Deferred Tax" if you will, and immediately the revenues of the State were increased $2,000,000 annually and from this source the Greater Agricultural College at Baton Rogue is being built.

Great wealth had escaped full taxation for years, because our State had not yet grasped the idea of "Deferred Taxes." These taxes are sure—no guess work—the production may fall off for various reasons but whenever visible, whenever mined, the tax is levied against the value of the product. Production is not hastened—new fields not hastily opened up—the State is in no hurry because the deferred taxes are sure. Defer, meaning to put off to a future time, to postpone, to delay, is probably the best term that can be used to explain the method of taxation of immature products or crops, and yet there should be no thought of taxation against that which is not visible, unripe, immature and yielding no revenue, for deferred taxation is speculative on crops or products having only a future or potential value. Land needed for agriculture in its natural state has a value as unimproved land; when cleared and placed in readiness for cultivation the value increases, but only when crops are produced are values for taxable purposes placed at full value.

The ploughing of the land, the planting of seed, the cultivation and finally the harvesting of the crop, after months of labor places an additional value on the land and crop, and at harvest, when money comes from the crop to pay all necessary expenses, taxes are paid. But it would be very unjust if taxes were exacted monthly while the crop was growing. Thus the value of the land in January or June is not nearly so great as in December. So deferred taxation on agricultural land or the crop that is produced thereon, goes over for twelve months, the time necessary to produce the crop when there is money to pay taxes. The same principle applies to deferred taxation on timber, only the time necessary to grow this crop is 40 to 60 years and while the crop is growing in value year after year, it is only when something can be sold therefrom that a tax on the timber in addition to the land is levied. Deferred taxation on timber means a fixed annual tax on the cash value of the land for forest purposes and an additional tax on the value of the timber produced thereon at the end of a certain period or when the timber is harvested, and this is known or called the "Severance Tax," a "Yield Tax," or a "Deferred Tax." No one advocates any tax exemptions. The man who grows trees can and will pay his just share of taxation. He simply asks that taxes be not pyramidied while the crop is growing and before he can expect returns from his crop to pay taxes.

The ideal system as I see it to encourage the practice of forestry on cut over, idle forest lands, is to place a fixed value on the land for annual taxation and a deferred, severance or yield tax on the timber when cut and marketed of at least 10% of the value. If after 40 years, which is really a short period in which to grow any timber of value, the land would yield 20 cords of pulpwood to the acre, worth $150.00 the "deferred or severance" tax would be $15.00 more per acre and this tax should be divided 60 per cent to the County, 25 per cent to the State, and 15 per cent to the Department of Conservation which has charge of the natural resources of the State. By this method there is no chance for any one to evade taxation and the State gets the maximum.

In many states the Constitution will not permit a severance tax as a lieu tax on timber when it is cut. In Louisiana the Department of Conservation is authorized to enter into contracts with land owners to grow useful trees thereon—to reforest cutover lands—for a period not exceeding 40 years during which time the land only is taxed; the minimum valuation being $3.00 per acre. At the end of the contract the land is then taxed on its value for land and timber. At 40 years if there is 10,000 feet per acre or 20 cords of pulpwood the assessment jumps from $3.00 to $100.00 per acre and at 60 years to $150.00 per acre. The timber is not yet ripe, is taking on its fastest growth—will not be cut for many years, but there is now a value to the crop and it is right that the deferred tax be paid. Louisiana in addition levies a severance tax of 2 per cent when the timber is cut.

And State that makes it possible for a land owner to reforest his idle lands plays the game of "Heads I win, tails you lose." To give a concrete example, twenty years ago I commenced the protection of a certain area of cutover land which was in the midst of a million acres of similar lands. My land is no more valuable today than similar lands all around and no increase in value over 20 years ago. But there is this difference. My lands will estimate 20 cords of unripe timber to the acre while the adjacent lands have grown poorer and more sterile and in 20 years more my lands will pay deferred taxes on a valuation of $50.00 to $100.00 per acre while the surrounding lands will still pay at the rate of $3.00 per acre unless the State or Government has acquired ownership for non-payment of taxes or a small purchase price. The State had everything to gain by making it possible for me to reforest my idle cutover lands. It is very plain to anyone who will think that it would be unjust, unwise, and unbusinesslike to levy an increased value on forest lands when seedlings were five years old, and again when the saplings were ten and fifteen years old, and again when the immature trees were thirty years old—pyramiding taxes year after year on which compound interest still further increases the burden. It is a man-sized job to pay the cost of growing a crop of timber even when you already own the land —it requires nerve, courage and vision to pay out 20 to 25 cents per acre annually for growing a crop which requires 40 to 60 years to mature, and no man, however able he may be, will undertake such a venture unless he knows in advance just what annual taxes he must pay on the land and the deferred taxes on his timber after he grows it.

There are many owners of cut over lands who would gladly undertake the work of reforestation if the State would encourage and deal justly with them, for they have no wish to keep vast areas idle and unproductive. Louisiana has 12,000,000 acres of forest lands and the South has over 1,000,000,000 acres unsuited and not needed for any other purposes than reforestation. What are we going to do about it? It is the peoples business. It is not too late to tackle the problem. You cannot get away from the question of taxation—that is paramount— it must be settled in advance if any land owner is to grow new forests. And then comes the reward—compensation. Deferred, severance or yield taxes in large annual sums on lands that would otherwise remain idle wastes—man made deserts. And what is the still greater reward that comes from the proper use of forest lands? What will my 50,000 acres of reforested lands mean to the nation 20 or 30 years hence? $1,000.00 per acre for the products delivered to the markets of the country of which fully 85 per cent goes for labor.

Lest we forget. By cultivation a crop of 15,000 feet of timber can be grown in 40 years where nature alone in the past required 150 years and where nature alone will never grow a crop of timber in the future unaided.

HOW MAY STATES BEST FINANCE FORESTRY?

By GEORGE VAUGHAN

VICE-PRESIDENT OF NATIONAL TAX ASSOCIATION

I

Forestry, in most of our Southern States, is a new and pioneer undertaking. Much has been said regarding the fundamental necessity of the adoption of a scientific forestry policy. Concededly, it deserves the Federal support which has developed within forty years a major public function challenging the admiration of all farseeing patriotic citizens.

Federal coöperation with local, public, and private activities in fire-prevention, the forests' greatests menace, has been accomplished through the wise provisions of the Weeks Act of 1911, and now promises tremendous expansion through the Clarke-McNary Act of 1924. Twenty-eight States were the recipients of $396,479.82 of the total expenditure of $1,869,564.78 made for fire-prevention in the year ended June 30, 1924; while thirty-two States participated in various Federal forestry funds to the extent of more than $50,000,000.

The subject of forestry finance, therefore, in its broader aspects is eminently worthy of the attention of State governments and budgeteers. But because of the lesser individual resources of the commonwealth, progress in these areas has been less marked; albeit there is a spreading recognition of the desirability of organized State activity, upon which Federal aid is conditioned.

Notably among States which have joined the advance movement in organized forestry work are Maine, New Hampshire, New York, Pennsylvania, Michigan, Minnesota, Oregon and Washington, Alabama, Louisiana, and score of others are yet in the initial stages.

Col. W. B. Greely, Chief U. S. Forester, in his recent (1924) annual report, declares: "The building up of State policies in forestry and of adequate and competent State agencies backed by intelligent public sentiment in every State having important areas of forest land is one of the most important developments that should be pressed forward."

II

Of prime importance in launching a forestry program are funds with which to operate. The history of State legislation discloses that nearly everywhere the beginning was along modest lines. For the requisite "sinews of war" recourse has usually been had to appropriations from the general treasury.

The general treasury is indeed a not inappropriate support of any policy of conservation of natural resources. The systematic practice of forestry undoubtedly tends to the "maximum social advantage," since, according to Gifford Pinchot, "wood is the most generally useful of all materials, and the storage and high price of wood affects all industries and all people."

The first stumbling-block in financing a comparatively unknown project, however meritorius, is the difficulty of impressing the public at large with the wisdom of the indispensable financial investment. Legislators are chosen at random from this same public-at-large, and too frequently they shy at any proposal for expenditure whose returns are long-deferred.

Hence it is that repeated efforts have sought to discover some kind of special revenue, the use of which will not perceptibly deplete existing resources needed for causes already entrenched in the tax-payer's heart. If the dollar needed for forestry is to be taken out of a scant community purse upon which, for example, the common school must draw, our legislator will ponder long before approving the shift. But if a new dollar may be unearthed in an unexpected spot the proposal is more readily entertained, especially if this new-found dollar has some easily traced connection with the special purpose to which it is to be applied.

III

In the severance tax law of Louisiana, originally devised by the inventive genius of our distinguished member, Senator Henry E. Hardtner, this benefit theory found conspicuous expression. And, although the Louisiana tax was designed to apply to forest products and the proceeds therefrom to be dedicated to the perpetuation of the forest's life, a portion only of the yield as now administered is retained for the original most laudable purpose.

Pressing necessities of other governmental functions have bred inroads upon the new tax, so that only one-sixth of the collections from forest products now goes to the Division of Forestry. This modicum, however, amounts to over $60,000 per annum, a fund sufficient to fairly well support the reforestation and fire-protection program of this most forward Southern State.

In Arkansas, a bill for a severance tax law was first introduced in 1919. The initial measure (S. B. 322) was based upon the economic principle of, and patterned in its provisions after, the Louisiana law. One-fourth of the proceeds of the tax on timber products was to have been devoted to "the promotion of the cause of reforestation," and a like share of the mineral products tax to "completing and publishing a geological survey of the mineral resources of Arkansas." The law, however, was not enacted until 1923 (Act No. 118) and now produces all-told about $1,000,000 per annum, not a dollar of which is devoted to conservation. Five-sixths of the entire net yield goes to the common school fund and one-sixth to public highways.

IV

The severance tax in essence, if not in name, exists in a dozen or more States of the Union, and has been found to be a thoroughly workable and constitutional mode of raising revenue.

Some idea of the significance of these production taxes is conveyed by the subjoined partial list, with approximate recent annual yields:

Alabama, coal and iron ore	$1,000,000.00
Arkansas, all natural resources	1,000,000.00
Kentucky, oil	200,000.00
Louisiana, all natural resources	2,300,000.00
Minnesota, iron ore	5,000,000.00
Montana, oil	500,000.00
Oklahoma, oil	7,000,000.00
Pennsylvania, anthracite coal	6,000,000.00
Texas, oil	5,000,000.00
West Virginia, sales	3,000,000.00

From a legal standpoint, this revenue instrumentality is classified as a privilege rather than a property tax. In perhaps every State the validity of the privilege or license tax is already judicially established.

The privilege tax indeed offers an appropriate form of tax for the support of the cause of forestry, since in its economic and legal essence it constitutes a special exaction for the privilege of engaging in a special business. Such a tax might be levied at a specified rate upon the operation of manufacturing forest products, and in order to obtain a wider distribution, it could logically be extended to all those business operations which depend upon the products of the forest. Conspicuous among these are the publishing and printing business, that of dealing in newspapers, magazines, books, and all printed literature, the transportation of wood materials, their utilization in construction operations, etc.

V

All forms of taxation are traditionally odious. But recent experience has shown that a tax against which there is a minimum of protest is that upon the use of gasoline and oil in motor vehicles used upon the public roads.

The motor fuel tax is rapidly becoming the backbone of the enormous revenue demands for construction and maintenance of the highways of this country.

Can we not trace the reason for the almost universal acceptance of the gasoline tax to the obvious fact that it is a most appropriate source from which to secure funds for good roads?

In like manner it should readily be recognized that a privilege tax, applicable not merely to those who sever or remove forest resources from the soil but to those as well who engage in the business of manufacturing, selling and distributing such products would rest upon as reasonable basis as does the gasoline tax.

By these remarks, I do not mean to say that forestry should be supported by this tax alone; but such a tax should be a dominant ingredient of the financial substructure upon which the forestry of the future must be fashioned. There are other plans, of course, equally as sound from a legal standpoint which are proving effectual in solving the revenue problem.

VI

In the time at my disposal only a few typical State financial schemes can be noted, and that very briefly:

The *Maine* Forest Service is supported by a system of taxation within the "forestry district," which embraces all wild townships and plantations. The land in the district, while subject to the regular State and county general tax, also bears the district special tax of 2¼ mills.

For the *New Hampshire* Forestry Department the legislature appropriates out of the general treasury $75,000 annually. In addition to this the department has available other funds including, of course, the Federal Government allotment amounting to $8,500. The towns bear half the expense of fighting fires; also, the railroads spend annually $38,000, and the Timber Land Owners Association tax themselves on an acreage basis for $10,000, for patrol work in coöperation with the State. Pennsylvania's expenditure through her Forestry Department in 1923 was nearly $900,000, as a direct appropriation from the general revenue fund.

In the representative Western State of *Oregon* the 13th annual report of the State Forester (1923) discloses an interesting statement of the sources of "funds for protection" as follows:

Timber owners and logging operators	$269,375.82	75%
Weeks law appropriation (Federal)	16,877.24	
Revested O. & C. R. R. grant lands appropriation	30,000.00	13%
State legislative apropriation	39,135.90	11%
Counties	3,400.00	1%
	$358,788.96	100%

A total of $98,767.22 of these funds was expended for fire fighting and the balance of the available resources was spent "for patrol, improvement, law enforcement and administration."

The *Alabama* Commission of Forestry, launched in 1923, is financed by the simple expedient of diverting to the forestry fund a definite share of the general revenue derived from the long stablished system of State license. The portion so appropriated consists of all taxes collected from forestry industries, which amounts to $30,000.

The *Louisiana* financial expedient—one-sixth of the severance tax proceeds derived from exploitation of forest products and amounts to $60,000 per year—has already been noted.

In *Arkansas* the severance tax derived last year from products of the forest at the statutory rate of 7 cents per thousand was $132,000, and if one-sixth of that yield, as in Louisiana, had been applied to forestry, that worthy cause could have enjoyed a net revenue of $22,000.

If forestry's share had been one-fourth, as stipulated in the original Arkansas proposal, the net would have been $33,000.

But it required a cut of 1,871,300,000 cubic feet of timber in Arkansas to produce at 7 cents the actual total of $132,000; whereas, in Louisiana the same amount of exploitation at 2 per cent *ad valorem,* the rate there applicable, produces at least $180,000.

Other auxiliary financial devices have been seriously considered; e.g., camp-fire permits in *California;* and a direct State bond issue in *Pennsylvania* and *North Carolina.*

VII

Finally, in this brief paper, I have refrained from any estimate of the amount of funds actually required for forestry operations.

The needs of the States vary because of varying conditions and extent of forest wealth and potentialities. The experts and technicians present can throw light upon this phase of the subject with far greater insight and ability than is at my command.

It has not been my purpose to point out, even if I could, a Northwest Passage to easy finance in the frontier field of forestry, but I have tried to show that your fiscal problem is not more baffling than that presented by any other public project, since it can be solved through at least five practical expedients:

(a) The general treasury, as in Pennsylvania.

(b) Special benefit taxation, as in Maine.

(c) A severance tax on raw material, as in Louisiana.

(d) A privilege tax, as in Alabama, on businesses utilizing finished and unfinished products of the forest.

(e) A special tax.

PROPOSED FORESTRY LAW FOR ARKANSAS

By DR. A. C. MILLAR

SECRETARY, ARKANSAS HONORARY FORESTRY COMMISSION

On May 13, 1924, Governor Thomas C. McRae appointed the following citizens as an Honorary Arkansas Forestry Commission: J. R. Hamlen, chairman; A. C. Millar, secretary; Adam Trieschmann, F. W. Scott, C. A. Buchner, C. J. Mansfield, B. A. Cannon, W. N. Bemis, R. E. L. Wilson, O. O. Axley, D. B. Dierks, T. W. Rosborough, A. B. Cook, Seth C. Reynolds, V. C. Kays, Chas. A. Overstreet, J. T. Bucholz, G. W. Donaghey, H. C. Couch, W. R. Stuck, H. G. Stephens, E. B. Kinsworthy, T. S. Buzbee, G. C. Hardin, J. H. McIlroy, Carl Hollis, J. J. Hughes, P. C. Ewan, D. T. Gray, Hugh Critz, Frank Horsfall, Moorhead Wright, and A. B. Hill.

In his letter of appointment Governor McRae stated his purpose as follows: "For the purpose of studying, formulating and submitting a plan for the protection, preservation and perpetuation of the forests of Arkansas, I hereby appoint an Honorary Arkansas Forestry Commission."

On May 28 the Commission met and organized by electing J. R. Hamlen president, A. C. Millar secretary, and Moorhead Wright treasurer, and authorized its executive committee to prepare for a later meeting by securing all necessary information and creating public interest in the proposed measure.

On December 12 the Commission again met, and after consideration of laws of other states and the tentative draft of a measure, agreed that the bill which follows should be offered to the legislature for adoption.

As the chief object of the Commission is to secure an organization charged with the responsibility of initiating a forestry policy, the bill was made to cover only necessary items, leaving to the next legislature the task of completing legislation after the conditions are fully understood. The simplicity and directness of the measure should recommend it to all friends of conservation. The expense of inaugurating this policy will be small, but the financial returns to the State will be large.

A BILL

For an Act to be entitled: "An Act to create and establish a State Forestry Commission; and to prescribe its powers and duties; and to provide for the creation of a State Forestry Fund; and for other purposes."

Be it Enacted by the General Assembly of the State of Arkansas:

Section 1. There is hereby created and established a State Forestry Commission, hereinafter called the Commission, composed of seven members as follows: The Commissioner of Agriculture, the Dean of the College of Agriculture of the University of Arkansas, and five citizens of the State to be appointed by the Governor, of whom at least three shall be owners of timber land or interested in the manufacture and sale of forest products. The terms of the five appointive members shall expire on December 31, of 1925, 1926, 1927, 1928, and 1929, the term of each to be designated by the Governor.

Their successors shall be appointed by the Governor for terms of five years each, except as vacancies are filled for unexpired terms; provided that the term of a member shall continue until his successor is appointed and qualifies. The members shall receive no compensation for their services, but they shall be reimbursed for actual and reasonable expenses while performing their duties.

Sec. 2. The Commission, on the call of the Governor, shall meet at Little Rock within thirty days after appointment, and organize, and shall meet at such other times and places as may be designated by the Commission, or on the call of the chairman, or of any three members. The Commission shall elect a chairman and a vice chairman, and fix the terms and the duties of their officers. The State Forester, hereinafter provided for, shall serve as secretary of the Commission, and shall be the custodian of the books, records, and papers thereof.

Sec. 3. The duties and the powers of the Commission shall be:

(1) To employ a State Forester who shall have been technically trained in the profession of forestry, and who, in addition, shall have had adequate experience in technical and administrative work in forestry, and to fix his compensation, subject to the approval of the Governor; to provide and equip office quarters for the State Forester and his assistants, and to allow the State Forester and his assistants such expenses as are necessary to the performance of their duties; to employ such administrative, supervisory, and clerical assistants to the State Forester as may be deemed necessary, and to fix their respective compensations, subject to the approval of the Governor; and to intrust to the State Forester the immediate direction and control (subject to the approval of the Commission) of all matters relating to forestry as authorized by law.

(2) To formulate and put into effect such reasonable rules and regulations as may be necessary to prevent, suppress, and control forest and woodland fires, and to encourage and promote forest, woodland, and tree planting and growing for the production of timber and wood crops and other beneficial purposes; to cause to be made such studies concerning forest conditions as may seem proper, including the subjects of marketing forest products by farmers and other owners of timber tracts;

to encourage public interest in forestry and forest conservation by suggesting school programs and using other means of publicity pertaining to the protection and extension of forests and the utilization of forest products; to coöperate with any Federal or State department, or institution, county, town, corporation, association of land owners, or individual, in the preparation and execution of plans for the management, protection, replacement, or extension of the forest, woodland, and other tree growth in the State; to control the expenditures of any and all funds appropriated or otherwise made available for the purposes of this Act; and under proper regulations and restrictions, specifically to authorize any officer or employee of the Commission to incur necessary and stipulated expenses in connection with the work upon which such person may be engaged; and to submit biennially to the Governor and the Legislature a report of expenditures, proceedings, and results achieved, together with such other matters as are deemed necessary, including recommendations concerning such legislation as is germane to the purpose of this Act.

Sec. 4. All moneys appropriated or made available for the use of the Commission shall be placed by the State Treasurer in a special fund to be known as the State Forestry Fund, out of which fund it is contemplated that moneys shall be paid for expenditures as the Commission may direct in carrying out the purposes of this Act.

Sec. 5. The Commission is authorized to receive any gifts or contributions that may be made by persons, associations, or corporations interested in promoting the cause of forestry, and may direct all or a part of such gifts or contributions to the maintenance of a chair of forestry in the University of Arkansas. The commission is further authorized to accept deeds, executed in the State of Arkansas, to lands that may be conveyed to the State for the purpose of creating a State Forest Reserve, and to provide rules and regulations for the management of such lands.

Sec. 6. It is hereby made the duty of all peace officers in this State to enforce the provisions of this Act, and the rules and regulations adopted by the Commission.

Sec. 7. All laws and parts of laws in conflict herewith are hereby replaced; and the immediate passage of this Act being necessary for the preservation of the public peace, health and safety, an emergency is declared to exist, and this Act shall take effect and be in force from and after its passage.

FORESTRY PROBLEMS IN SHORTLEAF PINE

By FREDERICK DUNLAP
SECRETARY, MISSOURI FORESTRY ASSOCIATION

The forestry problems we encounter in shortleaf pine are not very different from the problems presented in other forests. Such differences as do exist are mainly differences in the emphasis we must place on the different phases of our common problem.

There is an old English recipe for Baked Hare that starts with the admonition, "First, catch your hare." In applying forestry to shortleaf pine it is necessary not only first to catch your pine but to catch it in the hands of an owner whose resources permit him and whose disposition inclines him to follow forestry practice. There are, in the language of the silviculturist, certain minimum requirements owners must have—minimum requirements in financial resources and minimum requirements in the importance they attach to the business of growing timber. An owner may have the best of intentions but lack capital; he may have large capital but be averse to this use of it. He is as negligible in the one case as in the other.

No doubt the day is approaching in the shortleaf pine country when investments in growing timber will be sought after. But for the present the problem presents itself as one not for the investor with free choice, but for the owner who finds himself in possession of cutover land for which there is no acceptable market.

Foresters of course recognize that it is easier to begin the practice of forestry with a stand of timber than with cut-over land, but there are few such opportunities. It is usually the lumberman who has cut out and failed to find a market for his cut-over land who turns to us for help. What can we do for him?

For the sake of brevity and to open this discussion, I propose to assume certain conditions which are fairly general and to base on them an outline of the successive steps which will produce a new growth of shortleaf pine at a reasonable cost.

At the very beginning and of prime importance stands the problem of fire protection. Shortleaf grows not in remote and unpopulated parts of the country but here in the middle of the nation where there is a population that is concerned with what happens in the woods and that must be reckoned with. Fire in shortleaf is not a natural phenomenon but a social problem and must be so handled. Fires are set by men either carelessly or for a purpose. Our first business is to learn the facts. In its early stages our program is not one of policing our forests, but of educating our community. We must first enlist the support of the whole community in fire protection, and to secure this support requires an intimate understanding of local sentiment for the better. The advantage of effective community coöperation are so great and initial failure to get it is so costly that this is no job for a novice and no job for one not in fullest sympathy with the problem of the community in which he is working. The broad principle is that you must get community cooperation. The actual problem is to get it under local conditions which vary widely. There is no general procedure that will insure success. Once community coöperation is secured it must be supplemented by as much patrol work as may be demanded, taking care always to keep the patrol supplementary to community effort and never let it supplant it.

The second problems is reproduction to adequately restock the erea. Fortunately this offers no particular difficulty in shortleaf. Logging has left a few trees, even if they are not exactly what we would like and where we would prefer them. Shortleaf seeds so frequently and scatters its seeds so widely that the ground is well covered with seedlings in a few years. But seedlings require full sunlight for their best growth and where pines occur in mixture with hardwoods this is not available unless the hardwoods are cut. Do this if the hardwoods are marketable. If they are not marketable move the defective trees and weed species from the hardwoods by deadening. This will reduce the hardwoods by about one-half and correspondingly benefit the pine. Cut the merchantable hardwood at the first opportunity. To prevent restocking with hardwoods by running hogs in the woods to clean up the mast.

The third problem is financial, to keep down costs and discover possible sources of immediate income. Taxes and some supervision to prevent adverse possession are necessary charges against the mere ownership of land. Fire protection costs money and whatever measures are taken to improve restocking add to this cost. Income from second growth timber usually begins after a wait of ten to twenty years and to offset current expenditures some kind of current income is most desirable. Local conditions may afford now this and now that source of income, but usually in shortleaf pine live stock will offer the most generally available supplementary source of income. This is a business in itself and one to be treated more fully in the course of the discussion to follow.

But in the long run the financial success of the operation is going to depend on the net income from the timber grown. The first wood cut will be small in size and volume and low in quality. It is all the more necessary to make this cut economically and to market it advantageously, and not to accept it as a necessary expense against the operation. Careful planning is necessary to turn a liability into an asset, but it must be done if we are to reduce and not increase the charges against the business.

GROWING PINE IN THE NATIONAL FORESTS

By CHARLES A. PLYMALE

FOREST SUPERVISOR

Mr. Charles A. Plymale, Forest Supervisor in charge of the Arkansas National Forest, Hot Springs, was on the program to tell about growing pine in those forests. He said he did not know until he was handed a program that he was expected to speak, so he did not prepare anything. From his 16 years experience in the National Forests he had discovered that reproduction will take care of itself if the fire is kept out. Fire control is a community problem, and its solution is chiefly education. He tries to remove defective and diseased trees and species not merchantable like scrub oak that interfere with growth. If this work is a success the acreage is increased. Some lumber companies are becoming much interested in practical forestry. The Dierks interests are trying to practice the same methods as those of the National Forest. They leave a nucleus of seed trees for a second crop to be harvested in 60 years and trim up and burn the brush. In the National Forests trees under 14 inches breast high are not cut unless it is necessary to remove those that interfere with young growth. The lumber sales average from 2,000 to 3,000 feet to an acre. The forest is a pine stand, not oak. The fires destroy both the young and the old trees. There are fires every month of the year. In 1924 there were 443 fires in this National Forest and 121 outside which threatened damage, so the force of the forest were obliged to handle them. The total acreage affected was 14,000. The fire control problem is necessary for production of shortleaf pine. In so doing we must have the coöperation of communities. The question is chiefly one of education.

IMPROVED LOGGING PRACTICE IN SHORTLEAF PINE

By W. K. WILLIAMS

FORESTER, CROSSETT LUMBER CO.

In the past little attention has been given to the important question of improvements in the methods of logging for the purposes of protecting and encouraging the growth of young timber. Virgin timber being plentiful, and being heralded as inexhaustible led timber operators to direct their attention to problems at the mills. Such operations as sawing for grade, proper edging and grading, utilization of short pieces, kiln drying, and scientific operation of planers commanded their concentrated efforts. Studies involving the effect of regulated timber cutting on the economic situation in the community or State and its effect on the wood-using industries had not been worked out. However, certain factors such as the increased demand for lumber, depleting timber resources and the knowledge of extensive unproductive areas have in recent years been an incentive to studying the situation. Enlightenment which has come about through studying and working on the problems mentioned, has given us an insight into the timber situation, and an appreciation of the great importance of improved logging practices.

Although somewhat slow in recognizing the present situation, with experience and knowledge gained, we are enabled to take a good foresight on the opportunity which is still ours to do something genuinely constructive in averting a timber shortage and in conserving timber resources for future requirements.

In this connection, I quote in part what President Coolidge said in his address before the Washington Wood Utilization Conference, "Handled by the best timber-cropping methods, our present forest lands could be made to grow even more timber each year than we now use." He went on to say "But much of our cut-over land, lying idle or half productive is now an immeasurable loss, it pays little or no taxes, it keeps few hands busy, it turns few wheels, it builds no roads."

The conditions mentioned can be partially remedied through systematic regulation of the methods involved in cutting timber. Improved logging methods is one of the steps in rational forestry practice, which will bring about closer and more effective utilization of the timber now being cut, and in addition, it will put the area being cut to work growing trees, thus bringing about the development of a great deal of future timber wealth in the South.

The Crossett Lumber Company through its manager, Mr. E. W. Gates, began as far back as 1909 in working out the solution of the timber cutting problem, a diameter limit of 14 inches was first prescribed, only trees above this limit being cut. The cutters were given small rulers for the purpose of assisting them in determining diameters to be taken or left, thus eliminating all guess work.

The diameter limit worked well for several years, while the sizes of the timber, for which the limit was made, remained constant. The chief objections to the diameter limit were: (1) In stands of large sized timber the diameter limit was found to be too low, the result being clear cutting or leaving but an insufficient number of trees on the ground which were of the wrong sort and unable to effect immediate and complete reseeding of the area after cutting. (2) In dense stands of small sized timber the diameter limit left the reverse of the conditions mentioned above, taking out but few trees, hence leaving the trees too thick on the ground where they should have been somewhat thinned out. In the application of the diameter limit there can be no selection of trees best suited to be left. In old virgin stands, suppressed and rot infected trees with poorly developed crowns and possessing little or no capacity for either quality or quantity seed production were often left. This method of providing for the reseeding of cut-over lands proved ineffective and inadequate.

The second step in the improvement of timber cutting practices was the working out of systems for cutting different stands of timber; briefly two systems for regulating the cutting of loblolly and shortleaf pine timber were worked out. These systems now being applied by the logging department at Crossett are: (1) Clear cutting leaving scattered seed trees; this method is used in old virgin timber. (2) Leaving trees for a second cut. This system leaves a sufficient number of the trees on the ground, properly spaced, constituting a basis for a cut in the future.

In the first system that of leaving seed trees, only one kind of a tree is left, that being one capable of producing an abundant crop of seed right away. All other kinds and classes of trees such as the runt, pole, suppressed or rot infected, and the old veteran ready to go over during the first storm, are insufficient, dangerous, and wasteful of time, and money. The healthy tree with a well developed crown and extending well down the trunk to approximately one-half of its length has been found to give the best results. Two of such trees per acre and averaging 14 or 15 inches in diameter at great height are sufficient for reseeding that area.

The second method, that of leaving a second cut is applied only in thick virgin, hurricane, and old field stands, approximately 85 per cent of the volume of the stand is removed, leaving 15 per cent of the volume in young thrifty growing trees, well spaced and in a condition to put on the growth.

The success of the two systems is dependent upon the kind of logging equipment used in putting the cut timber on the right-of-way. Skidders and other forms of power rehauls are ordinarily agents of destruction to the young growth in the stand being logged, and to any trees being left for reforesting purposes. For the combined purpose of taking out logs and protecting the young growth, team logging is the most successful.

Our company's cut over lands reflect the value of team logging. A survey of the cut over holdings brought out the fact that the greater portion was reseeded with a good stocking of pine timber.

In putting into practice the described systems of cutting timber, at Crossett, care was taken to instruct all loggers of the problems to be encountered and the regulations to be observed.

If our logging department issued written instructions setting forth the principles of utilization and protection observed in the cutting of pine timber they would read something as follows:

1. *Marked Trees.* Trees marked with 3 or 4 spots of white wash are not cut. The spots indicating that they are to be left as seed trees or as trees for a second cut.

2. *Diameter Limit.* No trees 12 inches or under in diameter on the stump are cut unless a cutting is being made in a thick stand and it is deemed necessary to thin out the same.

3. *Stump Heights.* The height of stumps in all cases does not exceed the diameter of the trees. The maximum stump height is 24 inches, for trees greater than 24 inches in diameter.

4. *Tree Felling.* Before notching a tree the cutters decide on a place to throw it, so as to avoid felling it into, against or around a tree marked to be left.

5. *Protection.* No trees are thrown into groups of young vigorous growing pine, this can be avoided in most instances by proper notching and by pulling the tree to the right or left of the group in question. Where cuttings are made in dense stands, effort is put forth to throw the trees so as to bunch their tops in the openings.

6. *Breakage.* No trees are felled across stumps for in so doing great waste is incurred, through breaking and splitting. Care is exercised in the use of fall logs to prevent breakage.

7. *Stripping Areas.* The king swamper in stripping off cutting areas indicates the boundary line of each area by blazing hardwoods and pines which will be cut. Trees to be left are left unblemished so they can better withstand the changed conditions.

8. *Measuring for Grade.* After felling the tree, it is measured with strict observance as to log length and log quality or grade. In case of indecision or doubt due to the presence of rot or other defects, advice is sought from the foreman in charge. Briefly, the grade of the lumber produced is no better than the grade in the log, and for that reason it is particularly stressed that logs be measured and cut so as to have the surface clear to come in one log and the knotty portion in another log.

Straight logs are wanted. Crooked trees in many cases can be made into straight logs by cutting the crook in the center.

9. *Top Logs.* Logs of suitable sizes are cut out of tops in so far as it is economically possible. This is dependent upon the size of the log and the number and size of the limbs present. Close utilization of tops reduces the fire risk.

10. *Slash Disposal.* No limbs cut from logs or other slash is thrown around standing trees or into valuable young growth.

11. *Bonfires.* No bonfires are made in the woods during dry seasons. Fires built in winter for warming purposes are made in the open and not against stumps or standing trees. In building a fire the builder is required to see that necessary precautions are taken in raking back all inflammable slash and forest litter.

The key to putting the above mentioned regulations into action is in securing the happy coöperation of the men engaged in the cutting of timber. The logging department believes in seed trees for they will bring back the cut-over lands into heavy stands of timber again. They take pride in their work which is a glorious work composed of not only making provisions for the present generation, but also for making provisions for future generations of men. It is a work which not only develops economic stability in a commonwealth but it also affords that commonwealth satisfaction in that they are giving something of permanent value to their native land and to posterity.

In this connection, as a notable example, we can find none more convincing than the operations of Solomon in building his temple. Jehovah commanded Solomon to get cedar trees out of the mountains of Lebanon for the building of the temple and suggested that he use the Sidonians in so doing "For they knew how to cut timber." When Hiram, King of Tyre, heard of the contemplated plans for the erection of the famous temple, he advised Solomon that he would be glad to supply him with the necessary cedar and firm timber from Lebanon and he further advised that he would assist in getting the timber out. Solomon very graciously accepted the offer and agreed to furnish food and men to carry on the logging operations.

Undoubtedly Solomon can be justly proclaimed the king of all loggers, as he furnished 30,000 men such as hewers and carriers to get out the immense quantities of timber from Lebanon.

Since Solomon's time approximately 3,000 years have elapsed and Lebanon is still heavily wooded. The population has increased and the inhabitants in the cities and country surrounding the Mountains of Lebanon where Solomon did his logging, still have bountiful supplies of timber. The question arises as to what measures were used to perpetuate the timber growth.

When Jehovah commanded Solomon to build the temple, he suggested that they use the Sidonians "For they knew how to cut timber."

Gentlemen, we must cut our forests so as to make proper provisions for the immediate establishment of new stands of timber. We in Arkansas want future generations to have such timber resources as we have had the pleasure of enjoying. We want them to be able to say of us, as was said of the Sidonians —"For they knew how to cut timber."

TALK BY E. W. GATES

CROSSETT LUMBER CO.

Mr. E. W. Gates, of the Crossett Lumber Company, Crossett, Ark., enlivened the meeting by an interesting and instructive talk based on his 33 years experience in Arkansas. He began by saying that someone said you can tell a man from Texas anywhere, but you can's tell him much. He was reminded of this because a man from Texas had asked about the rate of growth and no one answered him. There are acres that will grow 200 feet of timber a year and others that will grow 600. The average land in Arkansas and North Louisiana not logged with a skidder will grow 200 feet a year. One can figure how many feet he will get an acre and how much the yield is, just the same as he can obtain his costs from his books. At $8 a thousand this would give $1.60 an acre a year. The mistake made is to capitalize too high. This should not be more than $3.00 an acre. The $3.00 is the capital stock and the expense on the 58,000 acres the company is reforesting under contract with the State of Louisiana is 9% of which 3% is taxes and 6% interest. Any one owning 5,000 acres or more is overlooking a bet, if he does not look into this game. Don't be so hard headed; get right and be doing something for yourself and for the world. Fire in March or in the early sap part of the year doesn't kill the tree, but it won't grow very much that year, except on the side that did not feel much heat.

Mr. R. D. Forbes said Mr. Gates meant by 200 feet growth an acre a year, that if he had a 40 year stand, he would at the end of 40 years have 8,000 feet to the acre; while at the rate of 900 feet a year, he would in 50 years have 45,000 feet per acre.

TALK BY EUGENE WATT

FIRE WARDEN

All day long the people who were in the Marion hotel were attracted to a man wearing a coonskin cap. Mr. E. W. Gates introduced him to the congress as Mr. Eugene Watt, one of the fire wardens of the Crossett Lumber Company, who has seven sons, was the seventh son himself and has three sons-in-law. He raised cotton in the season, looked out for fires and extinguished them, and trapped after the other excitement was over. He controlled 14 votes. His sons, his wife, his daughters and sons-in-law all are looking for fires. Mr. Watt is interested in keeping out fires because if they burn the forests, he doesn't get his hogs.

Mr. Watt said he was a warden, a trapper and farmer and a little mixed. He had a lot of trouble, for people would fire the woods. One day he loaned his pony and before it was returned, he saw smoke of a fire, so sent one of his boys to put it out. If he had had his pony, he would have caught the man, which would not have amounted to anything but he would have known who did it. When patroling, Mr. Watt carries a fire broom and a scythe rake. He beats out fire with the broom and makes a fire line with the rake, which can also be used for cutting brush. There are 200 trappers in Ashley county. At an average earning of $250 a season for each man in this business amount to $50,000. If fires continue to burn and destroy all the fur bearing animals this is a total loss to the trappers of Ashley County, Arkansas.

MONDAY EVENING

A get-together dinner was held at the Marion Hotel at 6:30 p. m. ($2.00 per plate). The Congress was again honored by the presence of Governor Terral. A number of members of the State Legislature and other public officials also attended. Following the addresses of Mr. E. A. Sherman and Dr. Herman von Schrenk, Mr. H. N. Wheeler Special Lecturer, U. S. Forest Service, gave a most inspiring and informing illustrated lecture entitled, "The Lure of the Forest." This was followed by a two reel movie, "The Forests of Tomorrow."

THE CLARKE-McNARY LAW. ITS LIMITATIONS AND POSSIBILITIES

By E. A. SHERMAN

ASSOCIATE FORESTER, FOREST SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE

I feel that it would be most appropriate for me to preface my remarks this evening with a few words of testimony expressing the debt of gratitude which the Forest Service officially, and I personally, owe to the President of this association. For a number of years past we have consistently relied upon him to back our efforts in Congress to secure urgently needed appropriations for forestry. More than once when Congressional hearings have been scheduled I have wired Mr. Holmes and he has always responded in person, and, in his capacity as State Forester, has thrown the weight and prestige of the great State of North Carolina into the balance on our side. Not once has he ever failed to rally to our support. We would be ungrateful indeed should we ever forget the favors of the past.

In this connection it is not out of place to remark that in the halls of Congress the conservation of our forests has generally received unstinted support from the South. In the House of Representatives, Gordon Lee, of Georgia, who for the past thirteen years has been a member of the National Forest Reservation Commission, has done marvelous missionary work in informing the southern members so that invariably we receive the backing of the solid delegation, not as a political or sectional policy but an economic one. We have many champions among the southern senators. For many years the senior senator from Louisiana has been one of the leading forestry advocates in the upper house. The senior senator from Mississippi introduced the resolution which resulted in the appointment of the Senate Select Committee on Reforestation, and he and the senior senator from Florida were members of that committee which submitted the report bringing about the Clarke-McNary Law. And "lest we forget," be it always remembered that in the dark days of Ballingerism Senator Fletcher gave loyal and unstinted support to Pinchot and the policy of conservation.

When your president complimented me some weeks ago by asking me to attend and address the seventh session of the Southern Forestry Congress, he kindly gave me the choice of speaking at the regular session during the day, or at the banquet in the evening. I promptly chose the evening opportunity. There were very good reasons for this; I know a good meal guaranteed your attendance as it did mine, and I wanted to really make your acquaintance as a sure enough human being. It is said one never really knows a man until he can recognize him in a crowd by a glimpse at the back of his neck. Certainly you never get acquainted with a man by making him a speech from a platform. But, when we have gathered about the board as tonight, I may, under the old Arabic custom, claim the privileges of the household's guest, having broken bread and partaken of salt with thee beneath thy roof.

It has been a long journey from out of the past to this banquet board. I do not refer to the distance between Washington and Little Rock, nor do I knock the efficiency of the Missouri Pacific as a transportation agency. My reference is prompted by the fact that in my twenty-two years service in National Forest work this is the first opportunity I have had to attend a meeting of your association. To become really acquainted, we must each know something of the other's past experiences. I know something already of the Association's past seven years. My introductory autobiographical sketch will be brief. I was born in Iowa. The first pine tree I ever encountered too tall for me to look over was at Chickamauga Park in the Spanish-American War. Shortly after that war, I was engaged in more dangerous warfare as an editor in Montana during the Daly-Clark senatorial feud, and finally landed in the Forest Service as a Forest Supervisor during the reign of Theodore Roosevelt and Gifford Pinchot. I have been licensed to practice law before the Supreme Court of the State of Utah, but have never practiced. From a more or less intimate acquaintance with the woods and woodsmen of the eleven western public land States I have assumed the right to practice forestry, unlicensed, before the bar of public opinion in any State in the Union whose people either produce wood or consume it. But if you are expecting from me an erudite exposition of some highly technical or scientific phase of the forestry problem you are going to be disappointed. My forestry talk is not taken from the books of Mr. Holmes' old buddy, Bill Schlick, but is all expressed in barnyard or street car English.

It has been suggested to me that for my subject tonight I might paint the progress of forest devastation in the westward march of the woodsman's axe and the saw mill from the Atlantic coast to the last great stand of virgin timber on the Pacific slope. I have decided not to do so. The story is not a new one and anything which I might tell you in connection with it would no doubt simply be a variation of a recital which all of you have heard many times before. The 81 million acres of desert land left in the path of forest exploitation is a lamentable fact known to all. Equally well known is the diminution of our stands of merchantable timber and the deplorable condition of millions of acres of cut-over lands. The more or less sadly wrecked condition of the 179 million acres of the forests of the South is a solemn fact which needs no emphasis to secure your appreciative understanding. It is needless to dwell upon details of the picture of desolation. Sufficient for the moment to admit and record that the forest problem in the United States has not yet been solved.

A few months ago a newspaper correspondent came into my office in Washington and stated that he understood our national forestry problem was solved and that there was no longer any danger of a shortage of timber in the United States. He claimed that this statement had been made by a forester of national reputation, whose name he could not recall at the time. However, he gave me the reference to the interview in which it appeared and I found that he was referring to a statement made by our dear forester friend, Austin Cary, who, returning from his year's work in the Southern States, spoke enthusiastically of the rapidity of growth of the forests of the South, and how these forests would furnish ample regional supplies of timber for the future if protected from fire and properly managed.

I read the interview, then sadly shook my head and in sorrowing tones told my enthusiastic newspaper friend: "You disappoint me: I was in hopes from what you said that somebody had found and applied a remedy. The remedy referred to here has always been known but has never yet been applied. Dr. Cary is right, but you overlook that tremendous little word 'if.' So long as our nation consumes more wood each year than it produces from the soil our forest problem remains unsolved. As yet it is only 25% solved, for we are consuming timber four times as fast as we are growing it. This would not be the case, as Dr. Cary says, *if* we protected our forests adequately from fire and managed them properly."

I am not going to ask you tonight to expend your emotions in crying over spilled milk. In forest devastation we have, from an economic standpoint, spilled milk enough to make a Niagra compared with which the original would be as trivial as the trickling rainfall from a cottage roof. As foresters we are all inclined to expend our emotions in sorrowing. The discussion of forest devastation has reached a stage where it is comparable to the weather, of which Mark Twain said "everybody is complaining and talking about it but nothing is done about it."

In the past the greatest obstacle to doing anything effectively to prevent forest devastation has been the absence of basic enabling federal legislation. Until Congress acted, the rest of the public, including even the timber operators and land owners, to a limited extent had a perfectly good alibi, but on the seventh of June last Congress called our hand and enacted the Clarke-McNary law, covering a great many of the things which we all believed to be essential to a sound forest program.

It is my purpose tonight to call your attention to the Clarke-McNary law and to some of its possibilities and limitations. In the first place, it must be clearly recognized that the passage of the Clarke-McNary bill did not in itself directly increase our forest area by a single acre, did not plant a tree, extinguish a fire, put an additional board in a lumber yard, or add a single shake to a cabin roof. Congress authorized a great many things. By itself it could accomplish nothing.

The first three sections of the Clarke-McNary law provide for the protection of forest lands from fire by coöperation between the Federal Government, the State and the private owners. They also provide for a study and investigation of the forest tax problem. The appropriation of not to exceed $2,500,000 for these purposes is authorized. Another section of the law extends the scope of the purchase provisions of the Weeks law so that lands desirable for timber production may be purchased on the water shed of any navigable stream, which means practically anywhere in the United States. The provision that no lands shall be purchased in any state unless the legislature of that State shall have first given its consent to the acquisition of forest land by the federal government, quite properly remains unchanged. Donations of land and their acceptance by the federal government are also authorized. There are a number of sections dealing with public lands but these do not apply in most of the territory covered by your Association. Sections four and five deal with farm forestry, one authorizing the appropriation of not to exceed $100,000 a year for coöperation with the states in the distribution of forest seeds and planting stock, and the other a like amount for coöperating with the States in assisting farmers in the proper management of their timber lands. The coöperation with any State under these two sections, as well as coöperation in fire protection, is conditional upon the State spending at least an equal amount for the same purpose.

Unfortunately the present condition of the nation's financial affairs did not permit the Bureau of the Budget or Congress to increase forestry funds so rapidly. The appropriation bill, as passed by House and Senate and submitted to the conferees, provides $50,000 for each of the two farm forestry bills, or fifty per cent of the total authorization, $669,000, for fire coöperation with the States, or 26 per cent of the amount authorized, and one million for land purposes, or one-third of the amount recommended. No additional funds were appropriated to provide for increased activities under any of the other sections of the law. Obviously, accomplishment under the new act for the next fiscal year, is limited by the volume of the funds provided by the appropriation. We must keep within it. We must endeavor to get the maximum mileage out of the gas furnished us, but we must not expect this new car to call at the financial filling station again until July 1, 1926.

Meanwhile, there is much that can be done. States, such as Arkansas, that have not yet qualified to receive financial aid from the government for fire protection, may well take advantage of the interim by passing the requisite enabling legislation. With the $100,000 available for farm forestry, a start can be made; the machinery of coöperation, distribution and service organized and basic principles threshed out and established. Consideration and study may also be given to the broad public question of the place of reforestation in our economic and fiscal program, that this work of ours should be given preference. In the last analysis that is a question for Congress to decide, as the taxpayers' official representative. In other words, the volume of forestry appropriations, must be determined by the force of public opinion. If the wood-growers and wood-users of the nation wish more money spent on reforestation they must make the real conditions known to their representatives and "sell" it to them as a public policy.

Even without additional funds some progress is already being made under the provisions of the Clarke-McNary law. You will recall that section nine of that law authorizes the President to create National Forests out of existing military reservations, where practical to do this, while still leaving the area available for use by the War Department in case of military necessity. Under this provision the President has already created three new National Forests, the Benning National Forest, near Columbus, Georgia, with an area of 79,000 acres, the Jackson National Forest, near Columbia, South Carolina, with 20,500 acres, and the McClellan National Forest, with 15,350 acres, near Anniston, Alabama. Nine other projects scattered from Florida to Northern New York, are under way. This is an admirable example of constructive planning for both the general welfare and the common defense. When war came upon us in 1917, it was necessary for the nation to acquire these reservations at a heavy cost of both time and money. Now through times of peace, the War Department retains the buildings and grounds needed for peace time purposes. The rest of the reservation is handled as a forest, but with the terrain available for the use of troops for manoeuvers and training purposes, which will in no way materially interfere with the productiveness of the forest. Then should a great war ever come

—which please God will not be for centuries, if ever—the entire area would immediately be at the unhampered use of our army at a mere word from the Secretary of War. This is almost pure magic. It is a case of eating our cake and still having it.

The other sections of the Clarke-McNary law deserving our special attention are the two farm forestry sections. Really I believe they present much greater possibilities than their author or any of the rest of us ever dreamed. I must admit that personally I never realized the part they might play in formulating the future forestry policy of our people until after the law was passed, and I had the pleasure of attending a forestry day picnic up in Congressman John D. Clarke's district in Delaware County, New York, where 3500 people gathered in a white pine grove on a farm eight miles from the nearest railway station and heard the owner of the farm explain how, and at what price, he had planted 220 acres of his farm to 250 thousand conifers, how the white pine grove in which they stood was volunteer stock forty years old, and would already cut over 25 M to the acre and bring out less than $10 or $12 per M on the stump, or from $250 to $300 per acre, without his turning a hand. We were in what had once been the premier dairy region of the Empire State; but the cheap forage and feed of the Mississippi Valley, the Babcock cream separator and artificial refrigeration, has changed the economic equation and the specter of the "abandoned farm" is just in the offing. The better business minds of the region look upon intensive forestry upon the poorer land and soils, coupled with intensive farming of the better soils, as their economic salvation.

While the farmer proprietor stood on an improvised table in the grove and told his farmer neighbors all about tree planting, Forest Commissioner Pettis of New York State took orders for over 400,000 small trees for farm planting, to be delivered to his farmer neighbors at the cost of their production, just the sort of business contemplated by Section four of the new law. Let us hope that by coöperation such stock may soon be furnished in every state on a similar basis.

This picnic gave me a new vision of the place of farm forestry in our economic equation. We have 150 million acres in farm woodlots. On the average they should be our most productive forest acres from the point of total production, total value of products, and low production costs. The lumbermen and wood-working industries throughout the country, and the members of this Association particularly, will do well to give every encouragement to farm forestry. It seems to me that the farmer holds the key to the solution of the forest tax problem. So long as the question of forest taxation is debated with a few large owners of cut-over timber lands on one side and the general public on the other there is not the slightest chance of real justice being done. The public does not understand and cannot be made to understand by any amount of argument. But when the farmer and small land owner puts his money into trees and begins to raise wood as a crop he will soon become silviculturally wise. You can bet your last dollar that Charlie DuMond, the owner of Pine Grove Farm, whom I have told you about, up in Delaware County, New York, understands the essentials of the forest taxation question just as clearly as Professor Fairchild of Yale University: and when all is said and done that question is going to be decided by the Charles DuMonds of this country and not by the Weyerhausers. Think it over. Encourage the DuMonds of your region to practice forestry. The result will be beneficial to the Weyerhausers as well as the DuMonds and doubly so to the nation as a whole.

This looks like a good place to stop. If I should continue longer you would doubtless class me with the speaker who was criticized by "Jim" Hill on the grounds of inadequate terminal facilities. Besides I have enjoyed myself so much at this meeting that I would like to come back another year, so must keep a few things up my sleeve ready to spring if it is my good fortune to meet with you again, and so, as our friend "Roxie" says over the radio, "Good night; pleasant dreams; God bless you."

TALK BY DR. HERMAN VON SCHRENK

Dr. Herman Von Shrenk made an interesting talk based on the timber acreage saved by the use of creosoted railroad material. He said he had that day visited the creosoting plant at Little Rock operated jointly by the Missouri Pacific and Rock Island railroads of which he is consulting engineer. He saw a lot of piling about 30 feet long, which he heard had come out of a comparatively barren field a few miles south of Little Rock.

He counted the rings and found the trees to be 25 to 30 years old. This piling when treated would be of sufficient strength to support the heaviest locomotives and trains. A few years ago their use would not have been possible for lack of preservative treatment, and there was thus a saving of trees and greater size suitable for different uses by reducing the number to be cut. Dr. Von Schrenk read the following:

Acreage to provide ties and lumber for the Missouri Pacific Railroad.

Used in 1923:	Quantity		*Acreage
Ties	2,516,204		41,936
Lumber	62,500,000	feet	28,000
Piling	20,000	pieces	4,000

Actual Saving:	1910	1923	Saving
Whole line ties per mile	392	272	120

120 ties equal two acres at 9,490 miles equals 18,980 acres a year.

In 1924 treated 2,000,000 ties which equalled 33,000 acres, instead of six years will get 12 years equaling saving of 198,000 acres.

Lehigh Valley Railroad: Average tie renewal 1898-1910, 226; 1923, 91, equaling saving of 135 ties, equaling 2.2 acres at 3,414 miles equaling 7,511 acres.

United States: Total ties treated 1909-1915, 228,830,151, equaling 3,713,736 acres or 530,534 acres a year. This acreage saved for at least six years from 1916 to 1922. The 3,713,736 acres is slightly in excess of the total area of Massachusetts.

TUESDAY MORNING

The Congress was called to order by President Holmes at 9:45 a.m. in the Ball Room of the Marion Hotel.

---

* On basis of 60 ties per acre.

NATIONAL FORESTS FOR THE EASTERN HALF OF THE UNITED STATES

By SHIRLEY W. ALLEN

FORESTER, AMERICAN FORESTRY ASSOCIATION

It is not with the claim that the idea of purchased National Forests is new or original that I ask your consideration of a program involving a considerable expansion in the work of acquiring National Forest lands for the country east of the Great Plains. It *is* with the idea that this end of forestry activity is not getting its share of public attention. Most of you are familiar with the operation of the Weeks Law which was passed in 1911 and which initiated the policy of purchasing lands for National Forests at the headwaters of navigable streams. The program conceived at that time had in mind the purchase of forested lands in the White Mountains of New England and along the Appalachian chain. So far, the work of acquisition has been confined to this section and the original plan of purchase is not yet 40 per cent complete.

Last June the passage of the Clarke-McNary Act, which has been so masterfully discussed at this gathering, enlarged the *scope* of the acquisition work authorized by the Weeks Law. It authorizes the purchase of lands anywhere on the watersheds of navigable streams for the strict purpose of raising timber. The actual advantage which the Clarke-McNary Law gives along this line is, so far, confined to a commitment on the location and purpose of land which may be acquired. You will remember that Section 6 which covers this matter in the Clarke-McNary Act fails to authorize the expenditure of any money, or to state just how vigorously the people of the United States, speaking through their representatives, propose to use this new authority. How then does this feature of the Clarke-McNary Act differ from the similar ones in the Weeks Act? This question can be answered by saying that the Weeks Law was passed at a time when, under the rules of both houses of Congress, first, authority, second, a fiscal program, and third, an appropriation, might be included in a single bill. In fact the Weeks Law did lay down a fiscal program for a period of five years and actually appropriated money for that period. The appropriations which have been secured for National Forest purchase under the Weeks Law, since the original appropriation was exhausted have been small. They have come in spite of the absence of a commitment of Congress to any definite program of expenditure. Each year it has been necessary to plead with the appropriations committee, especially with the House, because the chairman could not be referred to such a commitment.

The people of the United States, through their representatives, have declared themselves on a policy of limited Government ownership and operation of National Forests. They have failed to say through their representatives in Congress that *they mean business;* that they want this important work of acquiring land pushed until it is completed.

The necessity for the people of this country to say that they mean business is all the greater in view of Section 6 in the Clarke-McNary Act which broadens the original Weeks Law.

It is with this size-up of the acquisition business that the American Forestry Association has addressed itself to a great task. This is the task of securing an expression of demand for a definite fiscal policy concerning National Forest land purchases. The Association has secured the introduction of the McNary-Woodruff Bill in the present session of Congress. This bill would authorize the appropriation of three million dollars a year for five years beginning on July 1, 1926, and five million dollars a year for five years beginning on July 1, 1931, in all a program for the expenditure of forty million dollars over a period of ten years under the provision of the Weeks Law as amended. This includes the Clarke-McNary provision. The bill was drafted after an exhaustive study of the reports of the Senate Select Committee on reforestation which a little over a year ago declared that no less than three million dollars a year should be provided annually for National Forest purchase work. The study made by this select committee is exhaustive and significant. It is the report to Congress of one of its own committees which went to work thoroughly and conscientiously to get at the truth. The bill also was inspired by careful study of the reports of the Forester and with the knowledge of the difficulty of holding together an efficient land and title examining force for the work, in the face of inadequate appropriations.

Furthermore the recommendation of the National Forest Reservation Commission, charged with the authority of making actual purchases, were consulted, and liberal use was made of economic facts of the forest history of that portion of the United States, east of the Great Plains.

It is of extreme importance that the purchase work in the White Mountains and the Appalachians be continued, so that an additional three million acres of land may be added to the National Forests in these regions. The program suggests such action. Economy in administration will result here, from the consolidation of holdings which will be made possible by the additional purchases and it is from these mountain regions that immediate financial returns are flowing into the United States Treasury. As a matter of fact the existing group of National Forests in Maine, New Hampshire, Pennsylvania, Virginia, West Virginia, Tennessee, the Carolinas, and Georgia have more than paid their expense of administration and protection in the fiscal year ending June 30, 1924.

The program is designed also to extend to the once famous forest region of Minnesota, Wisconsin and Michigan, resulting eventually in the control of two and a half million acres in the Lake States region.

Of equal importance is the extension for the forest land purchases to the mountain and pine growing sections of the South, aimed at the acquiring of two and a half million acres of the land which now lies idle but which is potentially as productive as any forest land in the United States.

The industrial destiny of the South is inseparably tied up with its forests. With the possible exception of cotton, the greatest source of wealth in the South for more than a quarter of a century has been its forests. They have brought into your States 20,000 saw-mills representing an investment of more than one-half a billion dollars. They have created a business which stands first among the industries in six Southern States, second in four States and third in three. One-half million people are employed by these industries and the sale of their products has brought into the South, upwards of ten billion dollars in the last twenty years. It is a common saying that southern pine sets the price of soft wood lumber because of its dominant competitive position. The tremendous stand of the original southern forests which included some one hundred and twenty-five million acres and contained close to six hundred and fifty billion feet have shrunk 80 per cent under the worlds demand for their products. One quarter of all the pine cut to-day in southern forests comes from second growth which has come back, not because of careful management, but because of the wonderful productiveness of southern forest soils. One and one-quarter million acres a year of this second growth is now being cut and the crying need is for an example of forest management which will make it possible for pine forests to reproduce themselves. Habitual woods burning, general neglect and the competition of less valuable species can quickly make cut-over land in the South a liability rather than an asset. Two and a half million acres of the total thirty-five million which are idle put under Federal management and well distributed throughout the denuded portions of the South, is the part of this great program of forest acquisition which you are asked to consider.

The figures which I have read,—three million acres in the eastern mountain regions, two and a half million in the southern pine country and two and a half million in the Lake States, seem to cover a tremendous area. As a matter of fact, the total eight million acres which it is hoped to secure under the program, would not make six National Forests of the size which now exist in the west. The areas listed constitute only a small portion of the land now forested or which must eventually be dedicated to the business of growing trees. Is it not proper that the richest and most experienced agency of the western hemisphere, namely, the Federal Government of the United States, should undertake in modest measure the business of demonstrating that it is possible to practice forestry east of the Great Plains?

State and private activity in this line, it seems to me, may properly be led and supplemented by Government activity. All that can be done by the three of these agencies will not be too much. We must come to the practice of looking more toward the solution of our impending wood shortage and less to that of wringing our hands and pointing sadly at the mistakes of the past. The United States is not the first nation which has gone through a period of forest devastation before it learned that there is a way to eat the cake and have it. I believe that a note of optimism is needed. Let it be tempered of course by studying the mistakes of the past, but let it be vibrant with courage and assurance that our forest destiny need not be shrouded in gloom if we demand that the obvious relief measures be adopted. In other words there *is* a way out.

Fire protection, reforestation, tax laws which will support governments and still permit the private owner to practice forestry, wise utilization, and the matters of settling the ownership of our forest lands which ought to be at work—all these necessary activities must, in a measure, go forward abreast. But one or two of them are capable of being tackled with special vigor right now, and finished, so that we may have more energy to put on the others. Nothing seems to me to be of greater immediate importance than acquiring and putting to work Federal demonstration forests throughout the eastern half of this country. Universal support of the program suggested by the American Forestry Association and embodied, as far as its financial features are concerned, in the McNary Woodruff bill, will accomplish this. Whether the measure passes the present Congress or not, and as you all know this is a short session and a badly crowded one, resolutions supporting the bill are important at this time. They will help us to martial the friends of the measure at the first opportunity for a hearing. The supreme importance of well distributed National Forests in the South, I believe, merits the endorsement of the program by this body. I urge you to add to the movement, the momentum which your thoughtfulness and enthusiasm is bound to carry. No *movement* can stand still. We must either go forward or go back. This is no time to retreat.

THE PAST, PRESENT AND FUTURE OF FORESTRY AND LUMBERING IN THE SOUTHERN UNITED STATES

By BOLLING ARTHUR JOHNSON

"Prove all things; hold fast that which is good."

First Thessalonians: 5-21.

As long as grass grows green, and rivers flow, the sixteen Southern States of this Union, may account their forests and the products thereof, one of their chief natural resources.

Right there in that paragraph above are the words, which form the foundation stones, upon which will be builded, a superstructure of logic, based on all known facts, to prove that statement, so clear cut, and positive, in the end, that ANY man with an open mind who has followed through, will HIMSELF be convinced that every word of that statement is true; but to accomplish this history, the citizens of the South must do something more than sit down in a row and twiddle their thumbs, in the simple belief that FACTS may grow, out of hope ALONE!

* * *

(Thus began the interesting but long paper prepared by Mr. Bolling Arthur Johnson for presentation at this Congress. Owing to his illness the paper was mailed to the President at Little Rock and arrived too late to be included in the program. As the address is based on an article by the same author entitled "The South's Development," published in the *Manufacturers Record* of December 11, 1924, the paper is not printed here, the Editor quoting only the first and the last paragraphs which should be sufficient to induce the reader to go to the *Lumber World Review* for the up-to-the-minute news of, and opinions about, current forest problems.)

Mr. Johnson concludes his paper with the following striking statements:

"The Southern Pine Association, considered to be the largest commercial association in the United States, in any line of business, when looked at from the standpoint of its activities and amount of money spent in securing statistical information and trade extension—never has been satisfied with any existing statistics in regard to the stand of southern pine timber, and has recently been—in its own way—gathering direct 'Timber Stand' information, in every southern pine bearing timberland county or parish of the southern United States, compiling these statistics by direct work of a corps of men employed for that purpose alone, the investigation in the hands of an expert statistician, who—for a similar purpose—covered the same territory four years ago.

This work is not finished and may or may not be given to the world when it IS finished, but I am privileged to quote from the "Long Leaf Letter" a monthly message sent out to the friends of the Industrial Lumber Company of Elizabeth, La., under the direction of Robert M. Hallowell, one of the best known and most successful yellow pine producers in this country—who says in his "Long Leaf Letter" for September:

"Mr. Dunham is now completing a survey for the Southern Pine Association. His report will show the annual cut of southern pine as fifteen billion feet, and the annual growth as seven billion feet. He makes the statement that the production (cut) of southern pine will never fall below seven billion feet."

When one has considered the LUMBER production of these sixteen Southern States, that—really—is only one item of the evidence of prosperity, for the entire South, in its timberland future.

There yet remains the great matter of naval stores, the traditional "tar, pitch and turpentine," staves, headings, hoops, box shooks, railway ties, telegraph poles and the like, the whole category forming such an interesting picture for the great commercial Southland, that makes it certain, that the South will not forget its duty in the present, when it comes to appreciate how surely that will assure its prosperity—in the future—in all matters of commerce, contemplated in the question of tree production—in the soil best fitted to tree production—in the known world.

Reforestation is necessary, and obligatory, and should be; and may yet be made compulsory—some think—in some of the States of the South, which have not yet seen the light—but I do not contemplate any such probability.

The South has already—in many States—the necessary machinery of forestry association, forestry operation by States, co-operation with the Forest Service of the United States and may rest assured that with even the most ordinary help which may be given, to the artificial growth of timber, in the South, that the production of lumber and all of the products we have mentioned above, in the first paragraph of this last division of this monograph—will last for many generations yet to come. And, if the statement may be any comfort to OTHER lumber and timber production sections of this country now, in competition with the South, let it be known here and now, that the general prosperity of the South itself will in a few years practically consume all, of the soft lumber items, in the list we have mentioned above; but its hardwood will continue to be shipped all over the world.

PROBLEMS OF HARDWOOD TIMBER PRODUCTION

By E. F. McCarthy

SILVICULTURIST, APPALACHIAN FOREST EXPERIMENT STATION

The chief problems in the production of hardwoods, as presented in this paper, may be summarized as follows:

1. Proper capitalization of the land which must produce the forest crops.
2. Organization of forest property for timber production as a business enterprise.
3. The establishment of an adequate growing stock.
4. Rational expenditure of improvement funds in proportion to the producing power of the land.

The details of accomplishing these major objectives involve a multitude of minor tasks which cannot be enumerated in this brief time.

Categorically stated, the underlying facts are these, to which material objection will not be raised:

The hardwood forest in this country is in the East. It is found in the woodlots of the farms, on the swamp and overflow lands of the South, and on rough land unsuited to cultivation, chiefly in the Appalachian region, the Ozarks, the Piedmont Plateau, New England, and the Lake States.

Hardwood forest has very remarkable ability to reëstablish itself after the most abusive treatment, in fact it will produce some sort of timber crop even after cutting and fire, and only repeated abuse or very heavy grazing can entirely destroy its productive power. Planting on land which already has a potential hardwood crop, is not only unnecessary but a costly and doubtful procedure.

The history of logging in hardwood forest has been a series of repeated returns to the more accessible areas for poorer and poorer grades of material. If expediency continues to dominate the policy of hardwood management this will doubtless be the story until the forest is converted into a sprout growth where timber is never allowed to get to large sizes. The timber will be harvested for such uses as can be made of it, and since the best only will show a profit, the cull material will be left in the forest. This is the present outlook. It is a story which has already been written in its best style in the sprout hardwood forest of southern New England and New York and in other of the older and accessible regions. The significant fact is that the forest has persisted because there was no other use for the land, and so it will be generally over the hardwood region, until a long term interest in future crops succeeds the present demand for immediate returns.

This same haphazard policy is not only the history of past decades but it is current practice and the reason why it is not supplanted by a wiser, more far-sighted plan may be summed up in a single statement. No one feels assured of financial profit from a long time investment in hardwood forest. This is the outstanding problem of hardwood production. We have no experience in the business because no one has ventured into it. The reasons advanced amount to a general profession of doubt and ignorance of the problems to be met. The lack of a quick turnover stops even venturesome business men before they start.

There is one sound financial starting point—a minimum capital investment in each acre of potential forest land. The question of whether any private owner shall make a profit upon the future timber crop depends solely upon whether he capitalizes his present holdings too high. If this is accepted as a basic principle the real impediment to the continuous production of hardwood timber is the owner who has set such a value upon his forest lands that neither he nor the prospective purchaser can afford to hold them for a succeeding crop. If he has charged a sufficient amount of the original cost of the land and timber against the timber crop already removed, he may look to the production of the new crop without too great a burden of cost against it. With a proper recognition of value of forest land by the owner and by the public for taxation purposes, every acre of forest can be made to pay a dividend when the next crop is harvested. This will be especially true if protection and administration charges are prorated in accordance with the earning power of each acre. To deny this statement is equivalent to saying that the hardwood forest is not worth protecting from fire, or that if protected from fire the financial returns will not pay even this small charge.

Let me repeat my belief that the economic troubles which are today preventing the proper management of these forests are purely false paper valuations set up by owners through trading in forest property and by the public in assessing that property for taxation purposes. Both these errors have their source in the same evil, the evil of speculative trading in land. The so-called free purchase and sale when carried to a sufficient extent becomes the measure of value both for the owner and assessor and very few such sales of forest land have involved the slightest attention to the true value derived by careful computation from the annual net returns such forest land can make.

There is nothing new in the creation of false values for real property because in all cases of short time ownership there is the element of speculation, and the speculative buyer will pay any price which he can exceed or, as a last resort, duplicate in a sale. This is our measure of forest land values; this has been the measure of farm land values, and periodically some farm owner is forced to restore the natural balance in red ink on his balance sheet. This is just now happening in parts of the Northeast where the post-war prices of farm land cannot be maintained on fifty cent potatoes, cabbage at five dollars a ton and other farm produce in proportion.

Forest land values cannot thus quickly reach a true balance based upon production because the annual net yield is a thing no man has yet shown us on an organized hardwood forest. Still, this, the proper measure of forest land value, will prevail in the end and will set at rest all such phantom barriers as taxes and interest rates which, after all, are but reasonable charges upon a capital asset and are not burdensome if the capital value in itself is not too high. If we cannot pay with the products of the forest all the taxes, interest and overhead on the land at ten dollars per acre, then it is not ten dollar land. The forest must pay its fair share of taxes, so the rate should be that of other property, properly adjusted so that the tax shall not be duplicated. The financial world will demand a certain return upon its money so this factory, like taxes, is a fixed and not a relative term. The cost of administration must be met in accordance with other labor charges. When these are all viewed squarely, the one element which controls profit and loss which is capable of arbitrary fixing is the initial investment. It must be such a charge that the business of growing hardwood timber crops can start on a healthy basis.

Such a solution of a problem which has been vexing us for two decades will immediately suggest so many complications as to seem impossible. Practically, there are three major difficulties, the willingness of owners to give to land its true valuation, the willingness of the public to accept this valuation for taxation and underlying both these, the actual determination of the true value. In time all three will work themselves out even if it must be through the relinquishment of land for taxes. The problem is simplified because in general there will be no planting cost. The hardwood forest will reëstablish itself at no cost beyond protection from abuse—by fire, by grazing, by shortsighted use of the axe. It has come back, it is continuing to come back, it will always come back until it is cleared away and ploughed up, and even then it will come back if the plough is laid aside, unless it is burned down or grazed down. This is the heritage you buy when you buy an acre of hardwood forest land. It is all wrapped up in the purchase price, but—*caveat emptor.*

Let the buyer beware, because an error in capital investment is a fundamental error which will be a mill stone about his neck.

The question of what an acre of forest land is worth must be answered carefully and conservatively. The problem involves a detailed knowledge of the forest property in question which must be supplied in each case by a careful examination and a general knowledge of the laws of forest growth. This is the field of the experiment station.

Since market values of forest products will, in large measure be fixed by supply and demand, it will be well to survey the region capable of hardwood production. It is a comparatively definite entity, all in a portion of the East favored by soil and climate. The woodlot part of it is shrinking. Swamps are being drained for agricultural use and some of the most productive mountain valleys are being flooded for storage of water. Any attempt to extend the area of hardwood forest to other regions will mean a high initial cost for land and planting. An accurate statement of the acreage of this land, its soil quality, and the present condition of its forest cover would be extremely valuable. It has been estimated in part from the available data, but nothing beyond a very uncertain estimate is possible until a survey is made of timber resources. The best estimates indicate an annual yield, under the best management we can hope for, but little in excess of our present annual hardwood consumption. This will only happen when all the land is producing, and in the meantime a period of extreme shortage of hardwood saw timber is inevitable.

We are amply justified in expecting a general upward trend of stumpage values for any grade of hardwood material. For the best saw timber we are still far from the crest and are without any means of predicting what it will be until the cost of growing timber becomes a dominant factor in the lumber market. Long before the best grades have reached the crest of their value, the low grades will have flooded the market, because the proper management of a forest property will mean the removal of large quantities of low grade material. It seems logical, therefore, to assert that any computation of land values based on present day stumpage prices will be conservative.

Like the digging of gold, the placer mining stage of hardwood logging paid well in the best places. That stage has now largely passed to the working of low grade gravels and ledge rock. It is now time to incorporate on a larger scale and look forward to the period of future profits. Timber production has one feature that the gold mine does not: the value of the product will rise. A hardwood industry organized on a long time basis will have a plan; it will look the existing facts squarely in the face and, I venture to predict, it will succeed in acquiring land at a price which will permit the payment of dividends.

When such an organization approaches the question of land purchase and asks itself, "What is an acre of forest land worth?" it will find in looking forward that it is comparatively free from the market domination of Pacific Coast softwoods and that the inertia of the great bulk of hardwood land owners will make it unnecessary to count upon the competition of an entire organized hardwood region. It will find only a moderate barrier in the timberland speculator because the field of purchase is so large that natural laws of speculative interest will eliminate him, and the local public will see the justification of permanent enterprise and be reasonable in the adjustment of taxes upon it.

Valuation of every forest acre will then come down to a measure of the forest itself, to the principles of inventory and bookkeeping of a forest property. The first outstanding fact will be that dominant characteristic of the hardwood acre—it will reproduce itself without care, without capital, even with abuse. The problem is then reduced to a determination of how much care, protection, and improvement will be justified by the returns in increased growth and better materials.

The facts upon which the whole structure of hardwood forest management is built must either be acquired by experience or provided through research, on a small scale, in advance of the need. Organization of a forest property must follow the logical sequence dictated by its character and location, as well as by the purpose of the owner. Boundaries must be established, the area divided into its natural units as a farm is divided into fields, and all this information collected on a map. An inventory of the property is needed which will give, for the smallest unit recognized in the plan, the volume, age, condition, and growth rate of all timber, by species. Out of this accumulated material will arise the plan of management.

Since the forest is the reservoir of raw material which must supply the wood-using industries, they in turn must be considered in the plan and will welcome an inventory of available raw materials and an assurance of a continued supply. Whatever the source of materials, their value will eventually be established above the cost of production.

When these essential facts of the forest property are accumulated, when the period of years needed to mature the forest crop is known, another principle of forest management becomes apparent. That is the recognition of a growing stock. The growing stock is equivalent to half the amount of timber the forest can product in its full rotation. If the growing stock is depleted, the annual volume of growth of mature timber is reduced. That is one of our present troubles. The hardwood forest is not in its best producing condition because not only has its growing stock been very much over-cut, but the merchantable timber is largely past its most active growth. It is true that cutting has induced active growth in a large part of the hardwood region. Following the earlier cutting, which was very light, the young growth was largely choked out by the remaining older stands. During the past 25 years a vigorous young growth has started up. That is well, but since it is young and because it will be hindered by a poor grade of older trees which were not worth taking at the last cut, there is still a great gap in the age classes of our hardwood forest with no prospect of the present stocking being adequate to meet the annual demands. The trees which must produce our saw timber twenty years hence should now be twelve inches or more in diameter. These we lack. Because we lack them they will be in keen demand when the time of shortage in hardwood saw timber is felt. Shortage of saw timber will result in the sawing of smaller material and in this way our growing stock will be further reduced. The case is similar to that of using all the calves for veal to the point where none are left to grow to beef size.

Under these conditions, when we think of 10,000 acres of timber, growing 200 board feet a year per acre, we commit a mental error, because if this 10,000 acres is going to continue to produce 200 board feet a year a reserve supply of trees of all ages of its rotation must be properly proportioned throughout the area. The young acres are not growing any timber which can yet be sawed, so the more mature acres must grow enough more to bring the average up to 200 board feet per year. If the oldest timber is 80 years old and the youngest is just starting, the average age is 40 years. In 40 years the average annual growth on the whole tract will be equivalent to 8,000 board feet on each acre. This is working capital—the normal growing stock. If all our hardwood timber were counted in we would have far less than a normal growing stock: still we commit no economic error in cutting the mature forest. Just as we commit an error in killing calves for veal when we lack beef cattle to stock our range, so we commit an economic error in cutting fourteen-inch white oak into railroad ties, getting only wages for our labor, when the supply of oak saw timber is in its present plight. Of course this reasoning is subject to the law of supply and demand; but it is far more subject to contingency, the need of a dollar at whatever price to pay the taxes. Contingency admits of no argument but there is no place for it in the plan of management of the hardwood forest.

Closely allied to this proper conception of the character and need of a growing stock is an understanding of the relative growth rates of timber on the various qualities of land. Too great zeal for the improvement of all acreage can only result in loss of money and effort, for here again the principle of capital value enters. Profit must be computed on the investment, and some acres of hardwood forest land will merely swallow each dollar which is expended upon them. The best practice will dictate that expenditure for improvement be made first upon the best acres until a return can be definitely foreseen on the poorer land. The well known errors made in the clearing of poor farm lands should serve as an object lesson against too great haste in trying to develop the thin-soiled, dry hardwood lands.

A material improvement in all hardwood forest may be expected through protection from fire, and without fire protection the task of hardwood timber production is a very unpromising undertaking. Fire protection must be general, covering the good and poor acres alike, since all are involved as one hazard. Burning is followed by decay, and between the damage done directly to young timber by fire and the decay of larger trees as the result of fire scars, the profit in holding land for a timber crop is largely consumed. Continued fires will change an acre of good young growth into a liability, by encumbering it with crippled and inferior trees incapable of paying their own carrying charges or even of paying the cost of removal so a better crop can take their place.

Just as the lumber business has progressed through unknown business hazards and physical handicaps, so this task of timber production can be met by proper organization, foresight, and conservative investment. The progressive business man will realize that when the facts of forest value are common knowledge the opportunity for a profitable business venture has passed.

A period of years will be needed to acquire even a reasonably full knowledge of the laws of reproduction, growth, and yield for our very complex hardwood forest, and there will always be a chance for far-sighted men to forecast market conditions and work toward perfection of their forest property.

PROBLEMS IN THE MANAGEMENT OF ARKANSAS AND LOUISIANA HARDWOODS

By J. B. WOODS
LONG-BELL LUMBER CO.

Whenever the subject of hardwood management is raised for discussion a picture flashes before my mind's eye; a picture illustrating the extent to which scientific management of hardwoods can be carried. The scene is in that forest region of Bavaria called the Spessart, a rolling country of splendid oak. Not far from a certain roadside tavern a patch of very large and very old white-oaks stands like a run-down orchard, only one or two on an acre, their tops dying gradually from the inroads of decay.

One of these monarchs is down, pushed over after two hours of root-grubbing and hand-pumping by an hydraulic tree-felling machine. The local forester is instructing his workmen in great detail just how to cut up every part of this tree. But also he is busy with tape and caliper, measuring bole and branches and comparing these figures with a record he finds in a little hand-book, while a score of American forest students look no. This is logging in the famous Orchard Forest, where every tree is known by name and where the dimensions and even the infirmities of every tree are a matter of official record.

Someone asks the forester why this particular tree has been harvested instead of some other, and he explains the theory of management of the Orchard Forest. The contents of each tree are known, but of course the quantity is diminishing, for decay does not stand still. Similarly, the value of the wood in each tree is known, but that value is increasing, for market prices of stumpage are advancing. The forester watches his orchard closely, and when the loss of merchantable wood balances the stumpage appreciation, so that the total value of any individual tree ceases to increase, that tree is harvested.

It is a long jump from the Spessart to the river-bottoms of Arkansas and Louisiana; geographically and with respect to timber values. The Bavarian forester represents one extreme of the application of forest management. Possibly some Americans in the poorer stands of hardwood represent the other, the extremity of being unable to manufacture anything at a profit but obliged to operate nevertheless. Between these extremes is a wide variation of logging practice, but I believe that the majority of hardwood operators today find themselves in positions where some consideration of timber management is worth their while. And by timber management I mean the handling of forests over a period of years for the purpose of harvesting more than one crop of merchantable timber.

Never mind how indefinite this definition may appear regarding the length of the period and the number of crops. If we can dig out the fundamentals of hardwood management and apply them and accept such application as sound business the rotation period will take care of itself, and the crops will follow one another as often as is profitable. To cut over a hardwood tract and hold it unwillingly for ten years and then log over it again profitably may be purely an accident; but if the owner realizes finally that with the exercise of some little care the process can be repeated a second time, he has discovered one phase of forest management..

Such occurrences are not uncommon in these two states.

Ten years ago the standards of merchantability were more difficult than today. We left trees in the woods as too small which today are considered excellent; and we ignored species of hardwood which today are coming into their own. Thus two factors have been at work changing standards of utilization and growth. The factor of increased merchantability will continue to apply, extending to smaller sizes of logs and to such by-products as fuel and acid wood; and of course growth will go on so long as young trees are left upon the land.

Selective cutting offers the hardwood operator a chance which amounts almost to eating his cake and having it too. By selective cutting is meant of course cutting to certain standards of size and quality, with the dual purpose of producing profitable logs and leaving the woods in good condition for maximum growth. The close operator emphasises the yield per acre, thinking principally of distributing his fixed charges over larger quantities of logs and thereby reducing logging costs. His saving in costs may amount to something, but if he puts into his mill a considerable percentage of small and poor logs which will barely pay their way, he reduces the profit per thousand feet upon his annual cut, and often overbalances all of his operating savings. Further, when he finishes logging a tract there is so little thrifty stuff left upon it that the day when it can be relogged is pushed indefinitely into the future.

A white oak tree ten inches in diameter at the stump may not be sufficiently valuable to return a margin above the cost of converting it into lumber. If that be the case its stumpage value is little or nothing. Yet that little tree already has lived from sixty to eighty years or maybe more, and now has reached a point where ten or twenty years additional growth will add very greatly to its merchantability. Today it is worth nothing: in ten years it will have grown into a profitable log: thus all of the value increment comes in the last ten years of its life. Selective cutting spares such trees so that they may earn some money before they die. It can be shown that under normal conditions of land value and taxes, selective logging of a large hardwood tract over a period of twenty years is considerably more profitable than close logging.

But how is the lumberman to know where to draw the line between timber production and agriculture as the more profitable use for his land. We know that much of the hardwood land of Arkansas and Louisiana is alluvial in character and very fertile. Such land when free from unseasonable inundations and therefore available for cropping may sell at from twenty to sixty dollars per acre even though covered with stumps and slash. But the taxes upon such land are burdensome: for that matter they are mighty burdensome upon all forest land. So, if land is to be held for logging it certainly should pay its way. We can examine the land to determine its character and we can determine the earning power of the young growth. Then, with our tax and other cost data we can estimate the value of such land as a forest investment over a period of years. If we find that such land can be sold for agricultural use at prices which are in excess of our valuation figures (making due allowance also for increasing stumpage values), we scarcely can be blamed for letting the land go and looking elsewhere for forest investments.

However, much alluvial land is not immediately available for farming because of protracted and uncontrollable inundations. Drainage and levee enterprises are going forward constantly but they are frightfully expensive and not always successful. The value of overflow lands, regardless of fertility depend chiefly upon the flood factor, and range from one dollar to ten dollars per acre. Upon such lands hardwood timber, be it ever so slow of growth, offers a source of income attractive and reliable. In my opinion we can well afford to move slowly in the matter of forcing alluvial lands upon the market, when costly reclamation projects are involved. Rather should we attempt to keep these lands stocked with hardwoods of the more valuable kinds while agriculture settles upon the lands which are ready for it.

The rates of growth of the various hardwoods in general are uniformly slow. Such valuable species as forked-leaf and over cup white oak, ash, persimmon, hickory, sweet gum and cypress increase in size very slowly. Red oak, pin oak and cow oak are almost alone in their ability to grow rapidly. Such being true it is desirable to develop a forest which is at least partially stocked with the more rapidly growing species. This can be effected gradually by selective cutting and by introduction of seeds and transplants of the desired species. The results may seem rather trifling in terms of income, but over a period of several years the forest that is leavened with a fairly large percentage of fast growing species will show a higher yield and more frequent cuttings than the collection of slow-growers.

As an illustration of the difference in earning power of different species, I have in mind a certain creek bottom not over forty miles from Little Rock, where two even aged pole patches stood side by side. They are practically pure stands; one of sweet gum, the other red oak; and both contain something like two hundred trees per acre ranging in size from four to ten inches at stump, which is excellent stocking. If growth continues during the next ten years as during the past decade, the sweet gum stand will increase by two thousand feet of merchantable timber or two hundred feet per acre per year. But the red oak will add more than five thousand feet per acre in ten years, in terms of merchantable timber, or two and one-half times as much as the gum.

Much of the recent activity in applying forestry principles to the management of southern timberlands, has been among the people who manufacture pine. Pine grows more rapidly, is merchantable in smaller logs, and in other ways lends itself better to treatment as a crop. But many of the pine people own hardwoods either in creek bottoms or mixed with their pine. And some of them have seen their hardwoods grow in importance from an unmerchantable item to be left in the woods or used only for logroad ties into the major portion of their lumber output. So the pine men should be interested in certain phases of hardwood timber management.

In the upland portions of Arkansas and northern Louisiana hardwoods usually are found in mixed stands with pine. Such a typical mixture may contain both shortleaf and loblolly pine, white oak, post oak, red oak and hickory on the slope, and in the narrow branch bottoms, red oak, sweet gum, black gum and others. In volume the hardwood contents of such pine lands is surprising; averaging as high as two thousand feet log scale per acre upon thousands of acres. From the standpoint of marketability however, the hardwoods are relatively less important, because so many of the trees are defective. They are twisted and shot through with decay, while their branches spread over the tops of young pines and hold them back. Yet this land is excellent forest soil, capable of producing a splendid mixture of pine and hardwoods upon every acre.

Of course the reason is fire. So long as the pine lands burn over frequently the hill hardwoods will continue to be idlers. They cannot develop into good sawlogs under bad fire conditions. Yet it is desirable from many angles that we continue to grow hardwoods in mixture with our pine. We find spots where soil or other conditions will not permit pine to thrive; and it is my belief that the ideal selection type forest of shortleaf pine (with trees of all ages growing together) can be obtained only when we encourage the growth of some upland hardwoods in mixture with our pine.

No discussion of the problems of hardwood management would be complete without a word about taxes. Though an annual payment of a few cents per acre may seem little enough in comparison with the value of the land, the factor of compound interest changes this aspect when viewed over a period of years. Bad as this may be from the viewpoint of the lumberman who would like to carry a forest investment for a long term, the problem has another and worse angle. The man who pays twenty-five cents per acre taxes, today has no guaranty that the levy will not be thirty cents next year. In fact he has good reason to believe that taxes will increase as time goes on. They always have increased; perhaps not yearly, but often enough to disturb one's budgeting. So this question of taxes stands squarely in the path of long time investments in hardwood young growth. And it is a problem which the lumberman cannot solve for himself; he must have help from the people of his State.

At the risk of being tiresome I am going to summarize the outstanding features of hardwood management, as they appear at this present moment and stage of hardwood lumbering. Selective cutting is the pre-eminent requirement, and its maximum development presents a real but solvable problem. One of the interesting side-lights of this proposition is the fact that most woods-bosses and contractors, if left alone would cut selectively themselves (at least in the matter of diameter limits) : they despise small logs and hate to handle them.

The utilization of land is principally a problem in finance but controlled necessarily by the fundamental law of land hunger and land supply. We are not yet faced by a land famine, while there is a prospect of timber shortage. And it is a fact that a growing forest of young hardwood cannot be replaced except by the passage of years, while land settlement projects can be instituted almost over night.

Fire is the bug-bear of upland hardwoods. Arkansas and Louisiana would be richer by ten millions of dollars in hardwoods alone if no fires had run through our upland hardwoods during the past twenty years. Stop these fires and the innumerable small oaks, hickories and gums will amount to something. And once again we come to taxes, a matter concerning the whole population of a State a little more directly than these other problems, and therefore possibly more difficult to solve. Much has been done by certain States in the way of tentative remedial legislation. But we have not gone deeply enough into the matter yet. The taxing of our future forest crop must be lifted out of the hand-to-mouth, day by day class, and put upon a plane of long-term financing.

HARDWOODS OF THE SOUTH

By V. H. SONDEREGGER

STATE FORESTER, LOUISIANA DEPARTMENT OF CONSERVATION

A great deal has been said of reforestation in the South and the greater portion has related to pines. Very little, if any, consideration has been given to the hardwoods. In Louisiana, east Texas, southwest Arkansas, and west Mississippi will be found the largest reservoir of hardwoods in the United States. All available species of oaks, hickories, ashes, and gums are to be obtained. In my opinion the reason that the hardwoods have not been studied more has been ignorance of three agencies. Foresters have not spent any time at all in the hardwoods, hardwood manufacturers have not given the proper consideration, that is supervision and study to the hardwoods with reference to the products that they could manufacture through efficient and selective logging and the public has not been educated to the value of the by-products that can be obtained. All three agencies have wrong ideas as to the true character of the lands in which the hardwoods grow. Unfortunately, the locality of hardwood timber has been called swamps and the impression throughout the country has been that the hardwood bottoms are constantly full of water with plenty of alligators, snakes and malaria.

This is not true, as the greater percentage of the hardwood bottoms are subject to overflow only during the winter months, or an average of not to exceed three months per year. Otherwise the bottoms are dry, with the exceptions of low, flat places called brakes, which contain overflow water which could not run off when the water receded. A small percentage of the hardwood lands will be converted to agriculture but the greater percentage of the hardwood lands of this section cannot and will not be reclaimed. This is especially true of the upland hardwood bottoms which average from one to five miles in width. To build levees to hold water within the channels of the creeks would incur an expense greater than the value of the lands reclaimed. Drainage taxes will not affect these lands much, as the hill stop abruptly at the hardwood bottoms edge. These lands will be used for two purposes only, namely, second growth timber lands and grazing propositions.

For the past ten years I have not only been practicing selective logging, but have been advocating this logging for both pines and hardwoods as the only safe bet for reforestation without large expense. Selective logging is where all available timber which commands a fair and profitable price on the market is removed. Selective logging permits the leaving of low grade trees and the unwanted species until the market is in such condition that it will be profitable to log them. The keynote to selective logging is the leaving of the woods in the proper condition for the growing of a new crop of trees, and this must be done through the leaving of seed trees of the species that predominate on the area. The fire hazard must be met and contended with, but is of very little trouble in the hardwood bottoms compared to the piney woods areas. The average hazard in an ordinary year does not exceed 60 to 75 days, in the fall months. Through my experience in the South in the last 15 years, I have encountered two dry periods where this hazard was increased in the fall of 1917 and in the fall of 1924, and these droughts would necessitate a fire patrol of at least four months or even more, depending on the length of the droughts.

With the leaving of seed trees reproduction in the hardwood bottoms is rapid and easier than in the piney woods. Hardwoods reproduce readily from the seed crop which is more constant and regular than the seed crop of the pines. The second method of reproduction is from so-called root runners or sprouts which are started from the roots and form valuable and large trees. Ash in the South seems to prefer this process of reproduction and red oaks follow close second with hickories and white oaks following in line. The third methods of reproduction is from stump sprouts, prevalent throughout the hardwood bottoms in the South, and although this does not make a high grade timber for saw mill purposes it is the means of producing pulpwood, creosoting material and other medium-sized second growth timber. In the alluvial bottoms cottonwood, willows and others reproduce rapidly from young twigs broken off from the limbs of the trees during the fall. Reproduction from these cuttings is noticeable up and down the Mississippi bottoms. All of the above reproduction is absolutely guaranteed if fires are prevented.

My observation as a lumberman in the past has been that the young hardwood timber is growing very rapidly and in fact surpasses the pine. Sample estimates have been made and I have been able to check up the growth per acres per year to 700 board feet as an average. Instances have been found of second-growth oak, gum and hickory growing as high as 1,500 board feet per acre in selected plots, but considering the many open places and waterways the average would be less. Instances of remarkable growth have been called to my attention, especially one in a letter written to me by Mr. A. B. Learned of Natchez, Miss., who states that they have cut the fifth crop of logs in 100 years off their holdings in the cottonwood belt above Natchez. The Learned Lumber Company was incorporated in 1824 and has been running since and this statement will be of value to the industry. Since advertising the remarkable growth in Louisiana of both hardwood and pines, I have had lumbermen cut samples of their logs showing such growth of oak and other species as 30 years old 30 inches in diameter and one red oak from the hill section of Louisiana showing 30 inches in diameter and 43 years old. My original observations were obtained as a log scaler years ago in scaling hardwood logs and I was astonished to find wide annual rings on the end of the logs. Checking this up with our inspectors at the mill I found that at least 30 per cent of the hardwoods cut in the last ten years have been from trees 50 years and under in age.

The greatest difficulty in hardwood management has been in securing proper logging methods. Carelessness has been shown by executive officers of lumber companies in proper supervision. Too much responsibility has been left to the woods foreman and not enough information has been given out as to proper log lengths and proper methods of cutting them. My own opinion is that the hardwood industry should improve the woods personnel because competition and quality in manufacture are the two paramount issues in the industry today. By training men properly and keeping them informed as to the requirements of lumber, employees can develop better material in the woods. It is self evident that wood takes first place in the number of uses to which it may be adapted. This fact in itself suggests the importance of knowing at the earliest possible stage of manufacture to what use the tree is to be put. The character of the raw material cut from the tree determines its use, therefore, care in cutting a log will serve to forestall the so-called waste in working up lumber. To do this properly the woods organization must be trained to the possibilities that may be derived from a tree before it is felled and cut into lumber lengths.

Another important factor relating to the hardwoods is the problem of securing closer and better utilization of the log after it has arrived at the mill. A great many operators through economic necessity must send short lengths and slabs to the waste burner as there is no demand from the consumer for them. I consider it of great importance that the hardwood industry, instead of advertising to sell upper grades spend a little time in forming some medium of exchange for informing both buyer and seller as to what is on hand. Recently a manufacturer asked me if I could locate for him oak and gum in pieces 7 x 9 inches square and 7 x 12 to 36 inches long, these species to be used in the manufacture of 10,000 radios. Another manufacturer requested me to locate for him several car loads of short length hardwood lumber to measure from 6 x 24 to 1 foot long, asking for 5-8, 4-4 and 6-4 inches thickness. Coincident with this request a manufacturer was worried with the waste that was piling up at his mill in shipping lumber. In taking the lumber off the stacks a great many of the ends had cracks and necessitated 2 and 4 foot cut offs. Other boards which were inspected at the chain were cut off to raise the grade, thereby creating a surplus of 2, 4 and 6 foot boards of oak and other species which were useless to him and had been sold as stove wood, etc. By informing the manufacturer of this condition steps were taken to get in touch with the operator as this was the material he was wanting.

Reforestation in the South, and especially in the hardwoods, is dependent first of all on selective logging. After the logs have been properly cut the second important step to consider is the proper utilization of the many products. Usual lengths and good grades of lumber are easy to sell, but disposing of the short lengths and low grades is the problem of today. My opinion, as well as that of successful manufacturers, is that the establishment of wood working industries will be the solution, thus making use of this so-called waste by manufacturing the many necessities required out of the hardwoods. The South has a wonderful climate, cheap living conditions, medium priced labor and all these factors permit the manufacturer first-class material at a low price. It is financial extravagance to send our lumber to northern markets, have it there worked up into the manufactured article and pay a high freight rate to ship the finished product back to the South.

Reforestation of hardwoods in the Coastal Plain is one of the easiest and most remunerative projects that can be carried on. The lands will always be idle as far as agriculture is concerned. The valuation of these lands will always stay low because they have no other purpose but that of timber raising, with cattle raising as a side line. The fire hazard is easily handled. Reproduction of the second growth is taken care of by nature and is rapid. If the hardwood people will but take the time to examine their holdings as to the logging requirements and check up on the cutting operations of the past twenty years they will find that normal growth has come back. By following this study to the mill and noting the rapid growth of the logs that are being received there, there will be no question that the information obtained from the study will help boost the reforestation of hardwoods which will be found a profitable enterprise for land owners and manufacturers.

In behalf of the hardwood operators in Louisiana the Department of Conservation through the Division of Forestry will appreciate any and all information relating to this subject and will be glad to confer with such corporations and individuals who are desirous of placing their hardwoods under the reforestation contract. What we want to do is to assist in the perpetuation of the timber crop on lands that cannot and will not be adapted to agricultural development.

THE GROWTH OF THE PULP AND PAPER INDUSTRY IN THE SOUTH

By R. W. FANNON

PAPER AND PULP ENGINEER

Had I been asked to speak upon the subject as it appears on the program, three years ago, I would have been at a loss what to say, as it is within only the last three years that this great industry has made an appreciable progress in the South. Previous to this time, the few southern mills were not considered a factor, as their production was not great enough to even affect the market. Today it is different as their production of wrapping paper has become so great that the selling price of kraft wrapping paper is influenced by the southern mills.

All of you are directly interested in the forest and its products, and the pulp manufacturers are also directly concerned with wood, for it is the basic raw material of their industry.

It has been stated that between 1869, the first year wood pulp production was reported, and 1922, the manufacture of paper in the United States increased 18 times while its consumption increased more than 20 times. American paper mills, in other words, were unable during this period to keep pace with the increase in consumption.

At the same time the American paper production was falling behind consumption, American pulp mills supplied with domestic and also imported pulpwood, fell behind the demand of the paper mills, so that the pulp imports, only a little more than 25,000 tons in 1899 had increased to more than one million and a quarter tons in 1922. Finally, the pulp mills have had to meet their pulpwood requirements through pulpwood imports, which since 1912 have, it is said, exceeded one million cords each year. It has been stated that 88% of the paper consumed in 1922 was manufactured in the United States; only 60% of the pulp used in making the paper was a home product and only 48% of the wood used came from our own forests.

Pulpwood is imported from Canada alone since it is the only country with suitable timber supplies near enough to make the transportation costs feasible.

The supplying of pulpwood for the American mills has become one of the outstanding problems of the industry, and the threatened embargo on Canadian pulpwood has emphasized the seriousness of the situation. Several days ago, in a conversation with a party who was selling Canadian pulpwood, he stated that this embargo might not be put into effect immediately but he looked for it within a period of five years. The wood he was selling, is rafted across Lake Superior to Ashland, Wisconsin, and from there loaded on cars to the mills from one hundred to two hundred miles away. For unrossed spruce, per cord of 128 cu. ft. the mills in my home district were paying from $15.00 to $16.00 per cord, while the rossed wood was selling for $22.00 per cord.

Due to the large investment and the nature of pulp and paper mills, they can not follow, as saw mills can, the retreating fringe of virgin forest. They cannot extract pulpwood from denuded and abandoned forests. Where then, will the industry turn for its supply in the future? In my opinion, it will turn to the South where pulpwood can be grown within a comparatively short time, that is from ten to eighteen years. The timber producing power of southern pine lands is far superior to northern lands. The growth of the pulp and paper industry in the South should be a decided stimulant to the reforestation of cut-over lands, as it will provide a market for thinnings, and human nature is interested in an investment which will give a return while living; this being possible with pulpwood, for within fifteen years, if conditions are favorable for growth, it could be grown and marketed.

As you no doubt are primarily interested in the mills using wood as basic raw material, I have only considered them. Looking back through a directory of 1910, we find one pulp mill in Texas using the soda process, one in South Carolina, and three in North Carolina.

In 1913, a pulp and paper mill was built in Southern Mississippi, employing the sulphate process. This process originated in Norway and Sweden, and was the most successful method of cooking woods with high resinous nature. Two mills, the first in the States, were built in Wisconsin in 1910.

Looking through a directory of 1917, we find one pulp mill in Texas, one pulp and paper mill in Mississippi, one pulp mill in Louisiana, one in Georgia, one in South Carolina, and two in North Carolina.

In 1921, there remains the pulp and paper mill in Texas, one in Mississippi, two in Georgia, three in Louisiana.

Within the past two years, Louisiana has shown the greatest growth; two paper machines of approximately 50 tons each have been added to two existing pulp mills, one model mill of 60 tons capacity of pulp and paper, having started last fall, and with one mill of 150 ton capacity now building. During the last two years, a pulp and paper mill supposed to make paper from stumps was built, but it is my understanding that this plant is not operating.

The one mill in Mississippi has doubled its production within the last year.

One bag plant has been completed by one of the oldest concerns in Louisiana, and it is my understanding that another paper bag plant is being built in Mississippi.

Along with the growth of allied industries, understand there is a plant making plugs for the ends of paper rolls, situated about ten miles from Little Rock.

As all of the above mills are using the sulphate process, a brief description of the process may be in order. This process originated in Norway and Sweden, and was brought to the States by the late Mr. Olai Bache-Wiig, with whom I had the opportunity of working. The sulphate process consists in digesting suitably prepared wood with a solution of caustic soda and sodium sulphide. The cooking results in dissolving the resin constituents of the wood, and separating the individual fibres from one another. The spent or black liquor as it is called is washed from the pulp and concentrated in vacuum evaporators to the proper degree and calcined in a rotary furnace. The soda compounds are recovered as black ash. The loss of chemicals in the cycle is made up by the addition of salt cake or nitre cake. This is mixed with the black ash, and subjected to a high temperature in a smelting furnace. The combustible in the ashe furnishes enough heat for the combustion, and for the reduction of the make up chemical to sodium sulphide. The smelt contains sodium carbonate, sodium sulphate, and a small percent of unreduced sodium sulphate, and is dissolved in weak washes from the caustic plant. When this solution has been built up to the proper degree, it is pumped to the caustic plant where lime is added, converting the sodium carbonate back to sodium hydroxide. After settling, the clear liquor is decanted, and is again ready for the digesters. The sludge resulting from the settling operation is washed sufficiently to free it of remaining soda compounds, and it is either reburned back to lime or is washed to the sewer.

The superior product made from this process acting upon resinous woods also proved its adaptibility as the feasible process to use in converting Southern pines to pulp. These pines have long, thick walled fibres, and also high specific gravities implying large yields per cord, and therefore are particularly adapted for making strong wrapping paper. While the sulphate process can be used in the manufacture of bleaching pulps, its principal product is an undercooked, non-bleaching brown pulp known as kraft pulp, the term a German one signifying strength. True to its name, this pulp produces a remarkably strong paper, very resistant to wear.

The sulphate process should be interesting to the southerner, not only because of its ability to successfully reduce resinous woods, such as the pines, but also because waste, such as slabs and edgings, can be utilized and the presence of knots pitch pockets, remnants of decayed wood are not very objectionable. A sulphate pulp mill therefore is particularly desirable to operate in conjunction with a large saw mill, for then practically the entire volume of the log can be utilized. It has been said that the sawed lumber represents approximately one-half of the volume of the log as it comes to the mill. Bark and saw dust, valueless for papermaking, constitute a large proportion of the waste; but it is safe to say that 20% of the volume of a log, exclusive of the bark, is lost in slabs, edgings, and trimmings. Tops, and defective logs left in the woods, thinnings and small logs would furnish a supply of raw material for pulp making even greater than that derived from sawmill waste.

The operation at Bogalusa as regards reforestation, and utilization of logging and mill waste is indeed commendable and is a fine example of the proper use of forest products.

In my opinion, it is a crime to waste any forest products and many saw mills and pulp mills are equally guilty in this respect. In this case the saw mill burning excess refuse which could be converted into pulp, and the pulp mill using logs which could be made into lumber. It is unfortunate that more large lumber operations are not carried on jointly with pulp and paper mills.

Only one who has actually operated mills in the North can fully appreciate the advantages a mill in the South has. A comparison of conditions in the North and in the South may be of interest.

In the North, practically all of the pulpwood is gotten out of the woods during the winter months when the timber can be hauled out on sleighs and on iced roads. As the wood is brought to the railroad sidings, it is shipped to the pulp mills and as the amount arriving is far in excess of the mills daily requirements, it must be unloaded and put into storage. As a result, it is not an uncommon sight to find in the yards of mills, anywhere from 15,000 to 50,000 cords of pulpwood. This reserve not only ties up a great deal of money, but results in added expense as insurance, handling charges in and out, but as the assessor finds his way about in the spring, taxes must be paid upon this large amount of wood. Not only must this reserve be carried on account of logging conditions, but mills must protect themselves as it is a well known fact that pulpwood sellers watch a mills supply, and price their wood accordingly.

In the South, where logging conditions are such that wood can be gotten out the year around, a mill need not carry such a large reserve, with consequent economy in so doing.

A mill in the North will receive its pulpwood in 16, 12 or 8 foot lengths, and cordwood will arrive in either 8 or 4 foot lengths. To suit the barking equipment, pulpwood greater than 4 feet in length must be sawed to proper length. To remove the bark, barking drums are used, and some may bark wet and others dry, and barking frozen wood is not an easy task by any means. Except in a few cases, the wasteful knife barker is rarely used.

From the chippers the wood is conveyed to bins over the digesters. The amount of labor and equipment of the northern mill is very much greater than that of the southern mill, which received its wood in either 4 or 5 foot lengths, and conveyed directly to a barking drum. If the wood is allowed to worm peel, the barking drum is eliminated. There are many other advantages a mill in the South has over a mill in the North but I have enumerated the above as they concern wood, and it is wood which you are mostly interested in.

At the present time, the pulp and paper mills of the far South are only making kraft wrapping and bag paper and container board, and as these are intimately associated with the merchandising of goods, any marked increase in the development of the country will unquestionably be reflected in an increased demand for these products. The Southern pine forests, with their cheap pulpwood, the excellent suitability of this wood for the sulphate process, and their nearness to the paper markets, will without doubt be called upon to supply in ever increasing proportion the wood required to meet the demand made by expansion of this phase of the industry. The rapid depletion of the northern pulpwood species will do much toward focusing attention upon the sources of supply in the South.

It has been reported that the Forest Products Laboratory at Madison, Wisconsin, has developed a process for making newsprint from southern woods. It is anticipated that it will be possible to manufacture a paper which will meet the demands of the newspaper publishers, and at a price, when manufactured locally which will successfully compete with standard newsprint in the southern market. How far such a product from the southern forests could compete in northern markets would depend to a large extent on which mills now operating can adapt their processes to the little used species still available to them.

There are many other grades of paper which can and should be made in the South, and which will be made when the price of drafts get low.

The manufacture of pulp and paper requires a very large amount of capital, and before anyone enters the business he should be fully aware of the amount of capital required, whether he can manufacture at a profit under poorest market conditions, and whether he can find a market for the finished product.

The growth of the industry in the South during the last two years has been abnormal, and the eyes of manufacturers have been turned this way.

I am in hearty accord with all movements for the elimination of waste in our industries, and for the preservation of our forests. I trust I have given some sidelights on a great industry, and inasmuch as the pulp and paper industry has established itself so firmly in the South, your Congressmen and Senators should be in accord with tariffs which will protect this great American industry and American labor.

GROWING TREES FOR PULP AND LUMBER AT BOGALUSA, LA.

By J. K. JOHNSON

FORESTER, GREAT SOUTHERN LUMBER CO.

What I shall say will be chiefly of local application. I find it easier to talk about the things being thought about and worked at. The Great Southern Lumber Company in 1920 started doing some things in the woods which they were led to believe would result in another crop of pine trees on their cut-over lands. They expect to need pulpwood and saw timber continuously.

Previous to starting the practice of Forestry five years ago, yields to be expected were not figured down to very much of a scientific basis, as desirable as such figures are. To state it plainly and simply, the company officials knew through observation that pine trees in that region grow mighty fast. They took advantage, of course, of the knowledge of well known men whose business it is to know.

One thing has evidently constantly held the company to the earth. The capacity of the land for great yields signifies nothing, but the protection of the region against those agencies which prevent yields means everything. Therefore, as the work progresses from year to year, access to data compiled by men who know is available which can be applied in anticipation of yields on young protected forests.

In a recent article in the "Southern Lumberman," Mr. R. D. Forbes presents some interesting data. He gives the following yields per acre in cords of unpeeled wood (loblolly pine) in North Carolina.

Age	Better Land	Medium Land	Poorer Land
20	37	24	
25	58	40	22
30	75	53	33

It is stated that these estimates have been carefully compiled. They seem reasonable. Comparative yields both in loblolly and shortleaf in the States of Arkansas and Maryland are presented in the article. Our attention is especially attracted to the following paragraph relative to slash pine:

"Slash pine which many thing is even a better tree than loblolly pine because of its heavy yield of naval stores, has not been studied much to date, but it is safe to say that its early growth is amazing. On the best acres it will yield as much as 12 cords of wood with bark in ten years, according to a few measurements by the U. S. Forest Service. At 15 years from 12 to 27 cords to the acre have been measured; at 20 years from 20 to 46 cords; at 25 years from 27 to 56 cords; and at 30 years 32 to 62 cords. These wide variations are due to difference in soil."

In this article an interesting discussion is presented about longleaf and certain hardwoods.

No doubt there is even now and will continue to be more and more reliable data as to yields under varying conditions available as a basis for computing anticipated returns from our young forests. The greatest task confronting the owner of denuded or idle lands is to do those things necessary to create and protect new forests.

At the outset, promise was made to discuss matters of local interest. That, of course, means BOGALUSA.

Including one ranger and six short time coöperative patrolmen, being men the State selects and pays each $25.00 per month to apply on their salaries during certain seasons, together with five other patrolmen paid entirely by the Great Southern Lumber Company, about 200,000 acres of land in Washington Parish contiguous to Bogalusa, is being kept rough. That means to say that during the dry summer and fall season, and up to this time, fires have been kept down on the area. This 200,000 acres comprised timbered lands, farm properties and cut-over forest lands. Nearly 150,000 acres of it is owned by the Great Southern Lumber Company. About 120,000 acres of this 150,000 acres is cut-over and is the scene of the present major forestry activities of the company.

Thirty-five thousand acres has been fenced against hogs. This required 75 miles of fencing. Some 25,000 acres of land thoroughly denuded is being planted by hand. Of this more than 10,000 acres will have been planted at the end of this season. Two million plants have already been lifted from commercial nursery and planted in permanent fields this season. Planting is under way at the rate of about eighty thousand seedlings per day. This is providing labor for about one hundred men and boys from nearby farms who know how, and like to work with the soil. This season's nursery should provide around four million plants, of which about one million is slash (Pinus Caribaea), nearly three million loblolly (Pinus taeda) and a much less amount of longleaf (Pinus palustris).

In addition to moving to permanent orchard all this nursery stock, the company has on hand, harvested last fall and early this winter, something near 3,000 pounds of longleaf seed, which is mostly to be seeded direct at the rate of nearly two pounds per acre. Direct seeding will be done some time in March when plant life is budding and migratory birds have disappeared.

Last fall the company secured 1,200 pounds of well cleaned slash pine seed. This is to be mainly used in the planting of this year's nursery. Henceforth it is thought wise to use as much slash as possible in the future planting. As far as we have been able to tell slash will grow and grow well on any site capable of growing any other pine tree in our territory, and is proving to be much less subject to insects compared especially to loblolly.

We stated that about 120,000 acres of the total area being patrolled is cut-over land, and that 25,000 acres is being planted by hand. That still leaves 95,000 acres of cut-over land. This area is in the main reforesting naturally due to natural seeding and protection.

The protection feature is a big item in the scheme. Not big in comparison to the work of the U. S. Forest Service in effectively patrolling millions of acres of our National Forests, or a few of the States like Pennsylvania or others with great State Forests, but in the heart of a piney woods parish in Louisiana, where up until very recently the annual burning of the entire area was accepted by the local public as a matter of course, even partial protection is a great achievement.

It is a big proposition for one thing in view of the amount of money it seems necessary to expend in keeping fires down. With the use of plows, usually pulled by Fordson tractors, and with kerosene torches, and fire fighting equipment, miles and miles of fire lines are burned along the road sides, around small farms, and young pine plantations. Of course the company has the advantage of the advice and coöperation of the forestry officials of the State and National Governments, yet that does not relieve a private company of the responsibility of spending enough of its own capital to put the fires out when they start, and to put the area in as safe condition as possible.

It is expected that henceforth, year after year, the fire hazard will decrease. Otherwise, it would seem an almost impossible task. The young forests, planted whether by hand or nature, represent invested capital and hence intensive measures are adopted for their protection. While the trees are small and young, fire would kill them all. They will in a few years reach a size above the danger of an ordinary grass fire on the one hand, and on the other it is expected that people everywhere will be less apt to permit the escape of fire through intent or carelessness.

Thus we see that the whole scheme of growing new forests is largely a matter of faith. But after all, what is there in life that is worth while, that is not founded on faith. From the lumberman's standpoint, Forestry is the long look.

WHY NOT MORE KINDS OF SOUTHERN PAPERS?

By VANCE P. EDWARDES[1]

ENGINEER IN FOREST PRODUCTS

The controlling factors in determining the development of the pulp and paper industry are the availability of a suitable timber supply and its nearness to the markets.

The stand of spruce and hemlock in the South amounts to about 9.8 million cords out of a total stand of 763½ million cords in the United States. On the other hand, the Southern hardwoods are estimated at 335.2 million cords as compared with 848.6 million cords for the whole of the United States, and the stand of pines is a still larger fraction, or nearly half the total, the actual figures showing 944½ million cords as compared with a total of 1,918.8 million cords.

The above advantage in hardwoods and pines is further emphasized by the rapid rate of forest growth. Probably twenty years are sufficient to produce pulpwood from both the hardwoods and pines on this basis. The area required to maintain on a sustained yield basis a mill located so as to use these fast growing woods will be much less than is necessary in colder climates. Further, the climatic conditions are such that wood can be harvested the year around; hence the necessity of maintaining a large supply of pulp wood in the mill yard with the attendant decay losses and the very heavy interest charges is obviated. The location of a mill close to a supply of timber naturally greatly reduces the freight charges, which may, and actually do in some cases in the older centers of the industry, amount to more than the original cost of the wood at the loading platform. Other factors which have a bearing on the manufacture of pulp and paper are fuel, chemicals, power, and labor. The South is particularly fortunate with reference to the supply of wood waste, natural gas, oil, and coal. The world's largest sulphur deposits are located here and power is available for the production of other chemicals. Moreover, the labor cost is as yet lower than is usually found in the eastern industrial centers.

Accessibility of the timber supply is but one factor. A region may have the ideal woods in abundance for every kind of paper, yet if it be isolated from the consuming markets by natural, economic, or political barriers, its resources go for nothing. In the South Atlantic, Lower Mississippi and East Gulf States the shipping facilities are excellent and the markets close at hand. With the advantage of timber markets, climate, fuel, power and labor all favorable, it is to be wondered why the paper production in the South has been limited mainly to those grades which can be made from soda and sulphate pulps. To understand this a brief outline of the pulp and paper manufacturing processes, emphasizing only the most pertinent points, will be of help.

---

[1] Forest Products Laboratory, Forest Service, Madison, Wisconsin.

Four kinds of pulp are now produced from wood:

Groundwood
Sulphite
Soda
Sulphate

The first, as the name indicates, is a mechanical process; the others depend upon chemicals for the production of pulp. The yield obtained by the mechanical process is quite high; the three chemical processes, however, produce only half of the original weight of the wood in the form of pulp.

In the mechanical process the wood is held against a revolving grindstone and literally torn to pieces. The pulp obtained is light in color but quite weak, and finds its principal use in the manufacture of newsprint, of which it forms about 80 per cent.

The sulphite process is used to produce a strong, light-colored fiber which can be used unbleached in the production of the cheaper grades of print paper but must be bleached for the better qualities, of which it forms a very large proportion.

Because of the nature of the two processes, mechanical and sulphite, it is impossible to produce satisfactory pulp by these means from any of the pines on account of the resinous character of the wood. While hardwoods offer no such difficulty, the resulting fiber is so short that the necessary strength is lacking. Furthermore, excessive power is required for the production of mechanical pulp. Hence it comes about that the only woods suitable for the production of print papers and the higher grades are the spruces, firs, and hemlocks.

It is possible to produce satisfactory pulps from all woods by the soda and sulphate processes, but the common mill practice is to use the soda process for the hardwoods and the sulphate process for the long-fibered woods. Possibly this is accounted for by the fact that the soda process was well established long before the sulphate method was introduced. The soda process produces a dark-colored pulp which before it can be used in book and magazine stock must be bleached and on account of its weakness must be mixed with an equal amount of long-fibered, light-colored pulp. Sulphite is the only pulp now commercially available for strengthening purposes.

The sulphate process produces an excellent grade of paper from spruce, fir, and hemlock, but is able also to handle very satisfactorily the long-fibered resinous woods. Therefore, because of the differential in price existing in favor of the pines, the sulphate process has been applied largely to that species. The pulp produced is particularly noted for its strength and is characterized by that and its brown color. The ability to use cheap woods and the toughness of the resulting sheet has enabled the kraft papers to drive many of the other papers off the market, though as yet it cannot compete with the light-colored all-sulphite wrappers. The color offers a barrier to its larger use so that kraft pulp finds an outlet principally in heavy wrapping papers and container board. The amount of pulp required for this purpose is large. Sulphate forms from 25 per cent to 50 per cent of container board, which in turn nearly equals newsprint in tonnage.

ADAPTABILITY OF SOUTHERN WOODS TO PULPING PROCESSES

When the kind of wood available is considered along with the limitations of the various pulping processes and the use to which the resulting paper can be put, the nature of the question becomes apparent. To recapitulate:

(1) There are no stands of the non-resinous long-fibered woods in the South sufficiently extensive to warrant the installation of large mechanical and sulphite pulp mills. Without these two pulps the cheaper print papers and many of the higher grade

varieties are eliminated from the list of possibilities, so that it is hopeless to expect any large development of that branch of the pulp and paper industry which depends upon the spruces, firs, and hemlocks as a source of raw material.

(2) The soda pulp industry has developed in accordance with the availability of the timber and the nearness to the market. About one-third of the total amount is produced in the Southern States. However, soda pulp must be strengthened by the addition of an equal amount of long-fibered light-colored stock, and the development of the industry therefore depends upon the amount of that class of material now available. This requirement naturally applies to mills in the established pulp-making centers of the country, but there the desired long-fibered pulp is at present more readily available.

(3) Kraft mills have followed the general economic law of development, and we find that the rated capacity of the Southern mills is now 90 per cent of the total. This ratio will probably not be greatly increased unless a way is found to produce a pulp which can be used as a substitute for light-colored sulphite.

Owing to the more favorable conditions relative to hardwood stands and a short period of crop rotation, it is probable that southern production of book paper will increase somewhat but will always be limited by the cost of obtaining a light-colored, strong pulp. This question is intimately connected with the future development of the sulphate pulp industry.

Under the present conditions governing the production of kraft pulp it is difficult to obtain by bleaching a sheet comparable to bleached sulphite and at the same time maintain the strength. If this combination could be effected it would exert a marked effect upon the development of both the soda and kraft industries in the South and would greatly increase the variety of papers which could be produced. The problem of so modifying and controlling the cooking of kraft as to obtain a strong and bleachable sheet has been made the subject of study, but the solution as yet remains far from perfect. Similiarly, the fundamentals underlying the bleaching process are being studied with a view of determining the controlling factors. Once this is accomplished the application of the principles involved may completely change present practice and allow the process to be carried out with a smaller expenditure of chemicals and with less loss and injury to the fibers. This work has progressed to a point where it may be stated that an improvement or modification of existing methods will permit the production of a satisfactory bleached pulp from kraft.

Incomplete as present knowledge is, much can be done to improve conditions in the kraft industry by a wider dissemination of improved cooking and bleaching methods and by the application to plant operation of principles already established. The more progressive companies are, of course, attacking both the problems of proper cooking and proper bleaching of kraft pulp. Progress has undoubtedly been made of late among these lines on the commercial scale, and there is great reason for encouragement regarding the final outcome.

The wider utilization of southern hardwoods is another opportunity for research. Their use in soda pulp or its equivalent has been developed to the practical limit in the production of book paper, and their use by other commercially established methods of pulping is not feasible. If it were possible to produce a light-colored pulp stronger than mechanical pulp from long-fibered woods which could be used as a substitute for both mechanical and sulphite pulp in the production of cheap print papers, the situation would be materially improved. This fact has been recognized at the Forest Products Laboratory, and fundamental research has been performed on this problem for over a year. While the results on a laboratory scale are promising, and a light-colored pulp, stronger than mechanical, has actually been produced, it still remains to adapt the method to plant operations. Until that time, no definite forecast can be made relative to its bearing on the situation. Shortly the opportunity will come, we hope, to verify the laboratory conclusions by commercial trial.

If any of the processes just outlined, namely, modifying and controlling sulphate cooking, improving the bleaching process, and finding a new use for the hardwoods through development of a new method of pulping are successful, the varieties of papers which it will be possible to manufacture in the South will be vastly increased and barriers will be removed which now prevent the full utilization of natural resources. The natural limitations imposed upon the South in pulp production may in the past have appeared insuperable. It is the work of science, however, to remove such obstacles wherever possible—not with the object of benefitting any particular section or region, but of increasing the resources of the country as a whole. As northern pulpwood stands continue to diminish, the necessity of the South taking an important share in production becomes daily more apparent.

FUTURE OF SOUTHERN PAPER PRODUCTION

By J. H. ALLEN

The time alloted for this great subject is so limited that my statements are to be proveable assertions rather than a discourse of consecutive logic.

In our great southland the old order of things changeth, yielding place to new "spirited laws" and the laws of nature are at work, creating a great new day filled with more opportunities than any days of the past. Today we have millions of acres of cut-over pine lands upon which the winds have blown an oversupply of seed, from which is sprouting natural pulpwood lots without a dollar of expense to the great states of the South. Our natural stand of wood lots (when I say wood lots, I mean lots of millions of acres) would cost, if these stands had been planted in Michigan or Minnesota, some $70.00 per acre, for $70.00 per acre is the average cost of the average wood lot in these States. These cut-over lands are growing yellow pine in a soil and climate that is friendly to the growth of pulpwood timber. Pulpwood timber will grow three times as fast in these great States as it will in the extremely cold northern States. The whole South should be awakened to the value of this great natural resource, for it is now certainly stated by practical men in the paper business, who know wood lots, that more money will be made out of these cut-over lands than has ever been made out of the virgin timber in the South. We do not have to wish for the virgin timber to be here again for opportunities. We do not have to go to the great northwest and change our home, our friends and our climate to continue in the forest products business. We have the forestry proposition at our front door. All we need to do is to realize that the opportunity is here and that the cash register will respond to the economical construction and operation of the kraft paper mill in the South and thousands of pioneer lumbermen will continue in their present abode in this great new order of the day —*provided taxes are adjusted and forest fires are prevented.*

In many States we have cheap natural gas for fuel; we have hydro-electric power for cheap power; we have the cheapest strata of labor that is found in the United States today and we have the railroads operating in the South that lend the willing ear to the industries along their rails. Is it not, therefore, sound economics, when we consider the great growth of the shortleaf yellow pine, the cheap fuel, the cheap labor and the wonderful railroad facilities, when we deduce that the South is the future kraft paper manufacturing location of the world?

The great lumber railroads of the South have been talked about on the street in New York to the effect that when the virgin timber was cut, their original tonnage in the South would be limited and their securities might decrease in value.

Some months ago the Missouri Pacific interested upon their rails a pulp and paper mill with a large capacity that proved to them that they would have a perpetual timber supply because they were assembling under their plant an acreage sufficiently large that with a conservative estimated growth, would grow enough timber annually to take care of the great timber supply necessary for the paper mill, thereby giving to the plant perpetual life. Was there ever a saw mill built in the South that could issue that same statement?

It is a wise railroad that will attract to its rails the perpetual output of kraft paper mills. It is a wise city that attracts to its neighborhood the large perpetual pay rolls of the paper mills.

There are cities in the South which have been depending upon oil and lumber for their great growth, that are now beginning to look for other avenues of development because the peak has been reached in these two commodities. Do you not see that it is only a short step for a city that has cheap gas fuel, cheap oil fuel, cheap coal fuel and cheap ligenite fuel, an abundance of shortleaf yellow pine pulpwood timber, and a progressive railroad desiring tonnage, to combine these natural economic elements with their cheap labor under the head of the new paper industry and enter forth into the new progressive day of forestry products?

There is only one caution to be issued and that is for the future stockholders of this paper industry and for the cities and railroads interested in the development of it to select the right men to analyze the natural and competent elements entering into this new industry so that the properties may be assembled, the mills built and the properties operated right the first time without the usual debauchery that takes place in any new industrial experiment. There are men today in the South, who are practical in this line of business and can do this thing right the first time and who will certainly be called upon to do this great introductory work.

Kraft paper made in the southern mills has been proven to have the same merit and strength as the kraft paper made in the northern mills and it can be manufactured at a lesser price; so in addition to enjoying all of the natural economic advantages, this new industry for the South will effect an economic saving to the consumers of the United States and in this great country of ours, where money can be made and an economic saving brought about, the success of the new thing is assured in advance. We may, therefore, with assurance, predict that the South will be, within the near future, the kraft paper center of the United States. It, therefore, seems to me that those of us who are interested in this great southland of ours, should awaken the present owners and holders of this vast cut-over land area to the fact that cut-over lands have a great and growing value; and that laws should be passed that would aid and encourage capital to develop this new frozen and seemingly inactive asset into the activity that the elements warrant.

The Southern Forestry Congress is doing a wonderful work, and as the head of the Concatenated Order of Hoo-Hoo, I desire to tender the services of all of our members, our officers and our magazine to the furtherance of this great cause.

REPORT OF NAVAL STORES COMMISSION

By W. L'E. BARNETT

SECRETARY

The forest region of the Landes, which includes parts of the departments of the Gironde and Lot-et-Garonne, is a triangular area of over a million hectares (2,500,000 acres). The Atlantic Ocean bounds it on the West, on the Northeast it is bounded by the Garonne river, on which is situated Bordeaux, the chief port of the region, and the triangle is closed by the Midouze and Adour rivers on the Southeast. Bayonne lies at the mouth of the latter river.

The Naval Stores Industry of France is concentrated in this region which is situated in the Southwestern part of the country.

The forests of Maritime pine are distributed in the departments of the Landes, Gironde, and Lot-et-Garonne as follows:

Department of Landes	516,000 hectares
Department of Gironde	461,000 hectares
Department of Lot-et-Garonne	100,000 hectares

(One hectare equals 2.471 acres.)

In addition, there are another 100,000 hectares of pine forests in the Departments of Charente Inferieure, Charente, and Dordogne. The Maritime pine of the Landes forests is of rapid growth, and, in addition to furnishing crude oleoresin, its wood is suitable for a large number of purposes.

The Maritime pine is admirably suited to the geological and climatic conditions existing in the Southwest of France. The winters are mild and humid with little frost, while the summers are warm and sunny. The average annual rainfall in different sections of the Southwest varies between 0.75 and 1.20 meters (29.5 and 47.2 inches), the rain falling principally in the autumn and late in the spring. The number of rainy days varies between 92 and 130.

HISTORICAL SURVEY

Somewhat more than one hundred years ago, the Landes region was one of the poorest in France, and was very unhealthy. Due to forest fires, and to neglect, the woods had been in a large measure destroyed. The dune land extending along the coast for a length of 200 kilometers (125 miles), and having a width of 4 to 8 kilometers (2½ to 5 miles) was bare of trees, and year by year the sand, blown by the winds made further progress inland. It was feared at one time that the extent of sandy, arid land would reach to Bordeaux. At present, the Southwest is one of the richest regions of France, due to the work of reforestation which has been carried out there.

While small forests of Maritime pine have existed in the coastal region since ancient times, the real work of reforestation was not commenced till the end of the 18th century. It was in 1787 that the engineer Bremontier commenced the fixation of the dunes with plantations of pine trees. The work of forestation of the dunes was completed in 1865.

However, up to the year 1857 only some 300,000 hectares had been planted in the entire region. The main work of reclaiming and reforesting the Landes was done by the engineer Chambrelent, who first demonstrated the practicability of the work on his own property at St. Alban near Bordeaux. The passage of the law of 1857 made possible the reclamation and reforestation of the 700,000 hectares lying back of the reforested coastal zone.

Although the dune region was completely forested by 1865, the practical reforestation of the entire region was not completed till 1892 when 965,584 hectares had been planted. But 500,000 hectares were planted between the years 1857 and 1870 —a surprisingly short period of time. The Landes region is one-tenth of the forest area of France.

OWNERSHIP OF FORESTS

In all, 88,000 hectares of duneland was planted by the Government, the object being primarily to fix a barrier to prevent a further shifting of the sands inward. The Government has since sold over 40,000 hectares (98,840 acres) of that land. The remainder has an estimated value of 100,000,000 francs.

Although some of the private forests owned by one person are very large, generally the forests are split up into a very large number of small lots owned by different proprietors. In the Department of Gironde, for example, 61,121 proprietors own 439,643 hectares of land, or about 7 hectares (17.3 acres) per person. In addition, there are 20,790 hectares of Government owned forests, and about 1,500 hectares of communal woods. In the Department of the Landes, the individual holdings are much larger, 21,316 proprietors owning 482,543 hectares of forests. There are also 26,220 hectares of Government forests, and 7,845 hectares owned by the communes.

The French proprietors are jealous of their property rights, and resent any attempt on the part of the Government to impose laws infringing on those rights. This feeling has until recently been largely responsible for the lack of an effective law destined to check forest fires. There is no hindrance to the right of the proprietors to act as they please with respect to their forests, except that they must not change the nature of the land, that is, they may cut down the forests, and neglect to plant them, but they must not utilize such land for grazing, or otherwise turn it into farm land.

Fires have from time immemorial ravaged the forests. Numerous projects destined to check this danger made little progress, due principally to the unwillingness of the forest proprietors to agree to legislation which they considered interfered with their rights. Finally, in March 1924, a law was voted containing measures destined to prevent and extinguish forest fires. A small subvention from the Government is granted for this purpose. The law also porvides for the creation of departmental commissions and associations of proprietors to coöperate in applying its provisions. The Government manages and works the forests owned by it according to a very rigid system.

The Government does not itself work its forests. Each year it sells at public auction, and for a period of five years, the rights to work certain sections of the forest owned by it for the gum and for the wood. If the trees are designed for felling, they are worked intensively for the gum during the first four years, and then cut down. In the case of younger trees, the successful bidder is permitted only to tap the trees under certain stipulated conditions. The returns from the Government owned forests in the Southwest vary from 120 to 260 francs annually per hectare. During 1923, in the Departments of the Gironde and Landes, the Government revenues from trees worked for the gum were 6,000,000 francs, and from trees felled for timber, 5,000,000 francs.

The direction des Eaux et Forets, the Government office which has control over the forests, is often criticized on the ground that in its operation of the State-owned forests in the southwest, it has in mind principally the sale of the timber, and fails to extract sufficient profit from the resinous products. The communes, and private owners, on the other hand, are primarily interested in those products. Consequently, their forests are less dense, there usually being at the time when the trees are ready for tapping only 150 trees per hectare, as compared with 250 in the Government forests. The annual production of crude gum per hectare is about 350 litres in the private forests, as compared with 290 litres in the Government forests.

MEANS OF TRANSPORTATION

Water Courses. Ciron—can float wood from la Trave for a distance of 26 kilometers; used chiefly for floating mine props; 15,000 tons in 1922.

Leyre—the most important river in the Northern part of the Landes region, flows into the Basin of Arcachon; in absence of a port at its mouth it is not fully developed. Moved 2,346 rafts with tonnage of 22,637 tons in 1922.

Midouze and Adour rivers—on account of railroad transportation they floated only 2,784 tons in 1922.

Lower Adour—important on account of transportation of mine props; carried 263,761 tons in 1922.

Railroads. The main line of the Compagnie du Midi traverses the whole region from Bordeaux to Dax and then skirts the rest of it to Bayonne.

There are numerous branch lines, both broad and narrow gauge that run out from the Main line East and West into the forest region. Besides these there are 70 cm. railroads that are used in the forest proper.

The Department of Gironde possess nearly 300 kilometers of lines in its forest region. The Department of the Landes has 700 kilometers of R. R. lines.

As a whole the railroad system which serves the region is good but is still not entirely sufficient for the needs of the region.

Roads. There is a good system of paved roads, both main and secondary over the whole region except in the part lying along the coast—however transportation conditions in the forest itself are still insufficient; more roads in the forest proper will have to be built. A great deal of the gum is still hauled by mule carts over very sandy roads.

Gathering the Gum in France. (From "Resines et Terebenthines" by Vezes and Dupont).

The Face. The season of turpentining lasts from March to October (period of active growth).

With the "hapchott," a concave ax, (French hack) the chipper marks the pines to be chipped, in February by taking off the bark at the foot of the tree. In March he lays bare the sapwood and chips lightly. The face or *carre* is thus formed; it has the following dimensions: 9 centimeters wide, 1 centimeter in depth in the sapwood, 4 centimeters of initial height. Every eight days the chipper must take off a light sliver from the upper part of the face to open the mouths of the resin forming canals; this operation is called *piquage* or chipping (40 *piquages,* or streaks a season). The face tends to rise gradually; it is continued the years following.

An idea may be had of how the face is raised by the requirements of the Administration of the Forests for leases of the State forests:

1921	Heighth	Width
1 year	60 cm. (23.6 in.)	9 cm. (3.5 in.)
2 years	65 cm. (25.6 in.)	9 cm. (3.5 in.)
3 years	85 cm. (33.5 in.)	8 cm. (3.1 in.)
4 years	90 cm. (35.4 in.)	7-6 cm. (2.75-2.36 in.)
Total		300 m., 9 ft. 10 in.

The bleeding or tapping alive generally provides for a rest period of a year after 4 years of cupping; after which a new face is opened at the base of the trunk.

Order of the Faces. (Diagram of order of Faces):

The 1st face is made to the East (sheltered from the winds).

The 2nd face is made to the Northwest (at angle of 120 degrees).

The 3rd face is made to the Southwest, etc.

For the pines to be taken out in thinnings (those to make cross ties) the faces are placed at 180 degrees (to economize wood), 4 faces still permitting a cross tie to be taken.

Some years before felling the forest and before the bleeding to death, a new face is commenced on the most vigorous pines before the preceding one is finished. This operation is called *carre-virage,* "turning the faces."

The gum is caught in a varnished pot or cup held in place by a concave zinc gutter (3.5 cm. x 15 cm.) stuck into the base of the face. The pot is held up and hooked to the gutter by a nail on which it rests.

Gathering the crop: the Amasses. The harvesting of the gum constitutes an *amasse* or gathering. The cup fills up with gum every five weeks at the beginning of the season; every two weeks when it is hot. It is then emptied by the chipper who pours the contents of the cup into the *Quarte,* or wooden pail of 17 litres capacity. When the *quarte* is full it is emptied in its turn into a cement vat or *"barque"* of 500 litres capacity, or into a sunken barrel. To transport the gum to the still, the gum is placed in barrels closed by a bung, chinked with moss. The barrels, three or five in number according to their size are carried to the loading point on the railroad or to the still itself on two wheeled carts drawn by a pair of mules or oxen. The capacity of the barrels varies with the region (340 litres in the Landes, 235 in the Gironde). There are 5 to 7 (sometimes 8) gatherings or dips in a year. The last dip is soiled with the "barras" or scrape.

The Work of the Chipper. Tools. We have seen the different operations of the chipper, "Resinier." Let us recapitulate in following the chipper in his work.

A chipper work 4,000 to 6,000 trees (15 to 20 hectares—33 to 44 acres) (according to the size of his family—W. L'E.B.) He chips up to 2,000 trees a day. Winter is his dead season. He employs it in brushing out the underbrush, in thinnings, in plantings, or in sowings. In February he marks the new faces by barking the tree on the total height which the face will occupy during the season. In March he places the cups and gutters and with his "hapchott" opens the face. Every 8 days (every four days in summer) he takes off a sliver of 1 to 2 centimeters and at the same time empties the water from the cups.

Six or eight times during the season, after every 5 or 6 chippings, he gathers the gum-dips—by emptying the contents of the cups into the "quarte" with his spatula (trowel). At the last amasse, or dip, he recovers the scrape which covers the face in a thick mass. To do this he scrapes the face with a little scraper (like a little hoe), called the "barrasquite."

The 4th year of the "gemmage," cupping, as the face is very high, he replaces the "hapchott" by the "rasclet," a tool having a long handle with a curved cutting edge (also somewhat like a little hoe). Or he uses his "hapchott" by mounting on a primitive ladder, called the "tchanque," formed of a pole with foot rests nailed to it at convenient intervals. It looks like one of the legs of a pair of stilts with more than one foot rest. (Its name "tchanque" is the same that was used for the stilts formerly employed by the Landaise shepherds).

The life of the chipper is hard and active, but normally it is fairly remunerative. He receives half of the value of the gum which he carrier to the still; the other half goes to the proprietor of the forest. From the chipper's half sometimes a certain percentage is deducted for depreciation of the material (cups and gutters).

Contract passed at Mimizan, after a strike, between forest owners and lessees of the Government forests and the Syndicate of "Metayers," tenant-farmers, and "Resiniers," gum gatherers, July 1906.

1. The "resiniers" shall have the right to half of the price of the gum, less a retain of 6 francs a barrel by the forest owners and lessees of the Government forests for cost of transportation and wear and tear on the material (cups and gutters).
2. The gum-gatherers reserve the right to make 6 or 7 dippings according to the quantity of the pines. The price of sale shall be based on the average of the Market at Mimizan and Pontenx (monthly average).
3. The barrels shall contain 340 litres and shall be verified by the Governing Board (Chambre) of the Syndicate (Union).
4. All allotment of the pines (for chipping) shall be made before the 1st of January of each year by agreement between the lessees and forest owners and the Government Board of the Union.—(Larroquette pg. 400).

Contract passed between Tenant-farmers and Forest-owners of the Lower Adour river—Nov. 11, 1920.

The chipping and dipping shall be done according to the instructions of the forest-owner. In consequence, the "resinier" (chipper and dipper combined) can only undertake to chip and dip those pines designated or marked with the marking hammer by the proprietor of the forest. He should dip by preference the pines intrusted to him by the forest-owner rather than those of others. The proceeds of the sale of the gum shall be divided equally between the forest-owner and the chipper. Transportation from the spot indicated by the proprietor shall be at the expense of the proprietor.—(Larroquette pg. 400).

The price of the gum is generally based on prices obtained as a result of public auctions of the product held by the communal authorities. These auctions are held at the end of every dipping, generally once a month. The price is based on the current market value of the finished products, spirits of turpentine and rosin.

Yield. The yield of crude gum for the whole of the Landes region is over 130,000 metric tons (143,500 tons avoirdupois).

1. *Annual Yield of the Tree.* The yield of the tree is very variable according to its age. For a "Pin de Place," pine of place (Pine not to be cut till the end of the rotation), one can count on an average:

	Gum	Scrape
At 25 years	1 kg. 2⅕ lbs.	.20 kg. .44 lbs.
At 50 years	3 kg. 6⅗ lbs.	.75 kg. 1.65 lbs.
At 60 years	4 kg. 8⅘ lbs.	.75 kg. 1.65 lbs.

A fair general average is from 1.6 to 2 litres a face.

2. *Yield of a Hectare* (approximately 2½ acres). The yield of a hectare depends both on the yield of the tree and on the number of trees to the hectare.

One can count on:

Cupped Alive	Gum	Scrape
At 30 years (250 trees)	250 kg. 550 lbs.	50 kg. 110 lbs.
At 50 years (150 trees)	500 kg. 1100 lbs.	180 kg. 396 lbs.
Cupped to Death		
20 year old pines (500 trees)	600 kg. 1320 lbs.	108 kg. 237.6 lbs.
Old pines up to 7 kg. per tree	15½ lbs.	

On an average one can count on a normal yield of a barrel of 340 litres (75 gals.).

The average barrel of 340 litres used in the Landes weighs .357 metric tons (787 lbs.).

The average barrel of 235 litres used in the Girondes weighs .2415 metric tons (532.4 lbs.).

235 litre barrel of gum yields 110 lbs. Spirits of Turpentine and 352 lbs. of Dry Material, chiefly Rosin.

Variation of the Yield and Quality of the Gum according to the Region. The yield and especially the quality of the gum varies appreciably with the region; the gum of la Teste has always been more in demand than that of Bazas, and has always brought a higher price; it yields more spirits of turpentine and clearer rosins.

Systematic studies of the gum are still lacking.

In comparing it to the report of M. Brougueyre which appeared in the Bulletin of the Syndicate of the Agriculturists of the Landes, in August, 1920, the region of the Landes can be divided into 4 zones by parallels to the sea coast. (See accompanying diagram).

YIELD BY 100 LITRES OF CRUDE GUM

Zones		Spirits of Turpentine	Dry Products (Rosins)	Water and Impurities
I.	Hourtin	21.3	66.5	12.2
	La Teste	22.1	67.1	10.8
	Biscarosse	20.7	69.1	10.4
	Soustons	19.8	68.5	13.7
II.	Belin	20.8	66.6	12.7
	Morcens	20.3	67.7	12.0
	Dax	19.9	66.8	13.3
III.	Bazas	19.7	66.5	13.8
	Mont de Marsan	19.5	66.7	13.8
IV.	Mezin	19.0	65.9	15.1

1. *Remark.* As the distance from the center (la Teste-Biscarosse) increases, the quantity of impurities increases. This explains, already, the difference in quality of the dark rosins, the dirtiest gums giving the darkest rosins.

If, on the other hand, we consider the composition of the purified gum (called by the French "Terebenthine," turpentine, i. e., the gum separated from most of the water and impurities) we obtain:

YIELD OF 100 KILOS OF PURIFIED GUM

Zones		Spirits of Turpentine	Dry Products (Rosins)
I.	Hourtin	24.3	75.7
	La Teste	24.7	75.3
	Biscarosse	23.1	76.9
	Soustons	22.9	77.1
II.	Belin	24.0	76.0
	Morcens	23.0	77.0
	Dax	22.8	77.2
III.	Bazas	22.8	77.2
	Mt. de Marsan	22.5	77.5
IV.	Mezin	22.3	77.7

2. The yield of spirits of turpentine at the maximum at la Teste, decreases as one leaves the center. If the places which produce the same kind of purified gum were joind by lines, they would make circular zones, having as a center the Basin of Arcachon. (La Teste is on the Basin of Arcachon).

As one leaves the Basin of Arcachon, the irregularities in the gum increase and the content of spirits of turpentine diminishes.

As to the yield of the gum per tree, a systematic study of this has not been made.

The cause of the variations lies in the quality of the soil; there are first quality yields and second quality yields as there are first and second quality wines. It is where the sand is purest that the best quality gum is obtained (Hurrah for Florida, she's got it on Georgia on this point).

We can state a paraleism between the increase in the impurities and the dimunition in the yield of spirits.

Is the loss of spirits due to these impurities, acting as catalyzers of oxydation, or to polymerization? (Polerisation?). This point has not yet been elucidated.

Variation of the Yield with Variation in Atmospheric Conditions. For the years of medium rainfall there is a maximum yield of gum.

There is less gum during very rainy years than during dry years.

There is, on the contrary, maximum yield of spirits during the rainy years, and this is explicable by the fact that there is diminished evaporation during the rainy years. (Vezes et G. Dupont—Résines et Térébenthines).

TABLE SHOWING THE REVENUE FROM AN HECTARE OF PINES OF THE LANDES

Revenue from an hectare (10,000 sq. meters) of pines from 15 to 65 years old.

625 pines situated 4 meters apart.

Cupping from 18th to 22nd year—150 pine × 4 yrs. = 1 bbl. of 340 litres, half of 500 frs.	250 frs.
Sale of 150 pines × 2.50 each—total	375
Cupping from 22 to 30 years—200 pines × 8 yrs. = 4 bbls. × ½ of 500 frs.	900
Sale of 200 pines at 4 frs. each—total	800
Cupping from 30 to 40 years—115 pines × 10 years = 10 bbls. × ½ of 500 frs.	2,250
Cupping includes 100 pines of place.	
Sale of 115 pines × 7 frs. each—total	805
Cupping from 40 to 65 years—160 pines of place × 25 yrs. = 37 bbls. × ½ of 500 frs.	8,325
Sale of 160 pines @ 65 francs (Av. Price)	10,500
Total	24,180
Less expanse of planting, working trees, making ditches, pruning, and cups and gutters	1,000
Net Revenue	23,180 frs.

This will give a yearly income of $25 a year.

(From Monsieur L. Poudenx of Pontonx-sur-Adour)
August 12, 1924.

The *Turpentine (Filtered Gum).* Filtered gum gives by weight (on an average):

Spirits of Turpentine	20% of the weight of the gum
Rosin	70% of the weight of the gum
Water and impurities	10% of the weight of the gum

The crude gum of the Maritime pine is normally a dough-like mass yellowish white in color, and having a special odor.

By fusion (heating up to 97 degrees C.—206 F.—for half hour) and cooling the gum separates into two layers, an under layer, small in proportion to the total mass, which holds in suspension the dirt and organic debris, and an oily upper layer, much the larger, which when rid by straining of the organic debris which soils it, gives the purified gum called turpentine (Terebenthine).

This turpentine, submitted to a steam treatment separates into two constituents, a volatile constituent, the spirits of turpentine, and a stable constituent, called rosin (*colophane* or *brai*, according to the color).

More than two hundred factories (stills) in the Landes region treat the pine gum to obtain the two commercial products, spirits of turpentine and rosin.

In general the process usually employed consists of a purification of the gum, by heating and fusion, followed by decantation and filtering. A distillation follows this to separate the spirits from the rosin. This distillation was done up to the last few years, by introducing steam into the stills, working by the batch or interrupted method, and heated either directly by fire or by a steam bath. To-day continuous vacuum process apparatus are used in some of the modern stills.

The Different Distillation Processes. As it is necessary to extract the gum in contact with the air, it would be better to empty the gum directly from the cups into barrels and keep these closed tightly till the time that their contents are distilled. Consequently, it would be better to do away with the reservoirs, either in the forest or at the still where the gum is left for a time before it is carried to the still, or before it is treated, owing to the lack of barrels. It is to avoid this inconvenience that the modern systems are designed. Before distillation, the modern factories (stills) wishing to obtain superior rosins, give their gum a preliminary purification in order to eliminate the foreign matter which has gotten into the gum during its stay in the cups. The purified gum which results, and which, apart from the modifications that have been produced by evaporation and oxidation, is identical to the products secreted by the resin ducts of the tree, bears the name of turpentine.

The factories (stills) which are employed in the manufacture of resinous products, can be classed according to the distillation process they employ, into the following categories:

1. Distillation with Direct Fire.
2. Distillation Mixte (Modified Direct Fire—steam is introduced with water during the distillation process).
3. Steam Distillation.
4. Distillation by vacuum.

I. DIRECT FIRE DISTILLATION SYSTEM

The direct-fire distillation stills are the examples of the primitive system of distillation in the Landes. These apparatus only permit the recovery of highly colored rosin—called brai in France (dark rosin). The process of distillation is to run successive charges, the still being able to distill at each charge from 250 to 400 kgs. of gum (1⅛ to 2 bbls.). The gum coming from the forest before being introduced into the still itself, is turned into a receptacle called the charger, where it is heated to a temperature of 50 to 60 degrees C.—122 to 140 degrees F.

At the moment it reaches this temperature, the gum is introduced into the main distilling apparatus and the principal operation of distilling lasts about an hour and twenty minutes. When the gum has been raised to a temperature of about 140 degrees C.—284 degrees F., the stiller commences to let in a thin stream of water to increase the proportion of water in the gum vapors and thus to avoid a too rapid rise is temperature. When the temperature of the apparatus reaches 160 degrees C.—170 degrees C. (320 F. to 338 degrees F.), the operation can be considered finished. The gate at the bottom of the still is opened and the rosin is filtered through filters sufficiently fine to catch the foreign bodies that would otherwise mix with the rosin and give it a bad appearance.

In this process the gum employed is absolutely crude, i. e., just as it was collected in the forest; it contains all kinds of impurities; chips, bark, caterpillars, sand, etc. The direct fire stills are generally made of copper.

Distillation Mixte (Modified Direct-Fire Stills). The direct fire system of distillation has been improved in the following manner: While the same appartus (alembic-still) is employed as is used in the direct fire system, a pipe ending in a perforated coil is placed in the interior. The operation of distillation is made as follows: when the gum in the still reaches a temperature of 110 degrees C.—230 degrees F., steam is injected; when the gum reaches 130 degrees C.—266 degrees F., water is admitted in increasing quantities in order that the temperature shall not rise too rapidly. The distillation is then conducted to 140 degrees C.—284 degrees F., and at this moment both the steam and water cocks are closed and the temperature is allowed to rise to 150 degrees C.—302 degrees

F., to obtain the complete drying out of the rosin and the operation of distillation is terminated. The mixed or improved direct fire method shortens the period of distillation 20 minutes. —(E. Courret, Constructeur des Appareils de Distillation, Bordeaux).

"This method makes paler rosin as the rosin rests a shorter period in contact with the metal."—Courret.

"These factories (stills) are generally furnished with apparatus for purifying the gum. These purifiers are either large shallow boilers in which the gum is melted and left to settle, or cylindrical agitating tanks in which the gum is first agitated by revolving arms and then allowed to settle, after which it is decanted over filtering apparatus. From the agitating tank the purified gum is run into small settling vats where the water and impurities are separated from it. This system allows a comparatively small agitating tank to fill numerous settling vats, and thus assures the daily supply of purified gum for the day's work of the factory." (The small vats are used only with the modified direct fire stills—in the steam stills there are either two agitating tanks of the same capacity, one of which is used for mixing the gum while a batch is settling in the other, or there are one or two separate relatively large decantation tanks. —W. L'E. B.). Above from "Aide-Memoire de Commerce"—Paul Razous.

Distillation by Steam Process. The steam engine, with closed boiler, has all the advantages of the other two (Direct-Fire and Modified Direct-Fire) without their disadvantages. The heating is obtained by hot water under pressure, by superheated steam, or by saturated steam.

This last method of heating is that which has given rise to the largest number of trials and inventions; practically all of the steam stills of the Landes use this method of heating. All of the apparatus are of the discontinuous or batch system, a charge of gum varying from 200 to 500 kilos—52 to 132 gallons—according to the size, is introduced into the alembic (still) and is run off. Before putting in another charge, all of the rosin is drained off.

In general, all the stills of this system are made with a double envelope, i. e., the inner or main part of the still is surrounded with a steam jacket in which steam at a temperature of 160-170 degrees C. (320-338 F.) circulates. These apparatus are furnished with a coil, differing with the maker, which increases the heating surface and which by its direct contact with the substance treated, shortens the duration of the distillation period.

On an average the stills have a capacity of about 400 kgs. of gum (about 105 gals.). The duration of the distillation period is about 30 minutes (17 to 30) to the charge. All of the stills are furnished with an interior steam injection pipe which permits the extraction of all the spirits of turpentine from the gum treated."—(Courret).

All of the stills have preliminary purifying apparatus—agitating and settling tanks. Generally there are two agitating tanks in one of which the gum is settling while the other is at work.

The gum as it comes from the forest in barrels, is either emptied into a covered cement receiving tank, from which it is piped to the agitating tanks, or it is dumped directly from the barrels into the agitating tank where it is heated and then piped to a small tank (usually partly below ground level—the purified gum coming to it by gravity) the same size as the still (having been thoroughly filtered on leaving the settling tank). From this tank it is forced by steam into the still.—(W. L'E. B.)

The minimum settling period is 4 hours.

The principal steam system stills are the Col, Dorian, Ropars, and Tixier (one of the simplest but one of the best).

Distillation by the Vacuum Process. The last system to be perfected has its appartus arranged so as to permit the employ (if not of an absolute vacuum) at least of distillation under a very reduced pressure. It is evident that in thus diminishing to a notable degree the air pressure in the alembic during distillation, the oxidation of the rosin (which is subject to oxidation in the alembic) is greately attenuated and consequently the color which it takes on there is diminished.

The latest apparatus of this type to be perfected is that of Monsieur Louis Castets, in which the employ of a vacuum is combined with the method of continuous distillation.

The principal of the last named method of distillation consists of introducing the gum, or turpentine (purified gum) into the apparatus in a continuous manner) to have the gum constantly feeding into the apparatus) and to recover continuously the finished products, spirits of turpentine and rosin, at the outlet of the apparatus; the products coming out by separate outlets, after being separated in the course of the operation by heat.

Effectuated under atmospheric pressure continuous distillation did not seem to give good results, if one can draw that conclusion from the scant success obtained by the apparatus belonging to this category. On the contrary, Castets' apparatus, which differs from the others in the employ of a vacuum and by a better circulation of heat in the conducting mass, has commenced to be used in the Landes (nearly all the big coöperatives use his system).

In this apparatus the turpentine (purified gum) is sucked up by a vacuum pump, mounted in a faisceaux (bundle) of vertical tubes heated by steam, and there rid progressively of the spirits of turpentine and water which it contains until it flows out in the form of melted rosin. As the temperature is lower than in the ordinary apparatus and the interior atmosphere a great deal poorer in oxygen, the rosin runs a great deal less risk of being colored than in the alembics (stills) of the discontinuous (interrupted or batch) method which function under normal atmospheric pressure.

For the condensation of the vapors, attention should be drawn to the installation of the most recently perfected multitubular condensers, which compact and of small size, give a more perfect condensation than the large coil condensers of the old type. It must be also noted that in the Castets apparatus the vapors sucked up by the vacuum pump and which escape to a first condenser functioning under reduced pressure, are condensed in their turn under a pressure of about two atmospheres. This process assures, better than the ordinary coils, the complete condensation of the spirits of turpentine.—(*Aide Memoire de Commerce*—Paul Razous).

By the addition of a chemical decolorant (Secret process) before the turpentine (purified gum) is distilled, rosins nearly as pale as those which result from bleaching in pans in the sun are obtained.

Sun-bleaching of Rosins. Bleaching in the sun is the method most commonly employed in the Landes region for bleaching rosin. The rosin is bleached in the sun from three to five weeks according to the weather. The pans employed are of the following dimensions: diameter 75 centimeters (29½ inches); depth 8 centimeters (3⅕ inches). The pans are made of zinc or galvanized iron. Preferably, the pans are set out in a damp place; some distillers even spray their pans with water. After the bleaching is finished the contents of the pans are dumped directly into the barrels in the yards and a sample taken from each barrel; all barrels have both grade and weight marked on them. The distillers claim an improvement of a grade over the unbleached rosin by bleaching for the first two dips and a progressive improvement up to four grades over the unbleached for the remaining dips of the season.

The same inventor, M. Castets, has very recently perfected a continuous steam distillation process. A still with this system of apparatus has been in continual operation at Hostens (Gironde) for nearly a year. It has given as good results as the vacuum system.

Briefly, the system works as follows: the gum as it is brought in from the forest is dumped from the barrels into a covered cement receiving tank. From this tank the crude gum is elevated by a Screw of Archimedes to a small cement vat from which it flows by gravity into the agitating tank. Here it is agitated and heated at the end of the day and left to settle over night. The day following, the purified gum is decanted off directly into the distilling apparatus which consists of a receiving pan, connected by a hood (not shown in blue print) with the condensor whereby any free spirits of turpentine sent off in the preliminary purifying process are recovered, a heating coil in a flat box nearly at ground level, and a final covered heating table (like an ordinary syrup evaporator) from which the rosin, freed from all spirits of turpentine, continually flows. The spirits rise directly from the table through the goose-neck to the condensor. The main distillation is done in the flat heating coil (which consists of a coil of four loops of copper pipe encased in a flat iron box). The coil is jacketed with a tubular steam jacket which furnishes the heat for distillation, and besides has a steam jet introduced into each of the four loops of copper pipe to furnish the necessary water for the distillation process. The flat table, heated underneath by steam, draws off the remaining spirits of turpentine which are caught in the hood covering the table and carried off by goose-neck to the condensor, and allows the rosin free from spirits to constantly flow off. The condensor is of the compact tubular type.

As in the vacuum process, a chemical decolorant is used for bleaching the rosin.

Taxation. Forest land in the French naval stores region is taxed very reasonably. The rate of taxation is readjusted every ten years and is based on the average revenue of forest land during the rotation (usually 65 years) of the forest.

Expenses are deducted, which include that of growing the pines thirty years without revenue (which practically exempts the land from taxation for the first thirty years of the rotation). Expenses include such items as: preparing the land for sowing or planting, when necessary; sowing; planting; making ditches; cost of preliminary thinnings, etc.

After the expenses are deducted, the total taxation, naturally higher for the latter years of the rotation, is distributed over the entire period of the rotation and an average is struck to determine the amount of the annual taxes.

For further information see "Les Landes de Gascogne et la Foret Landaise" by Albert Larroquette.

Near Dax the annual taxes per *acre* amount to about 9 cents.

Organization of Proprietors and Workmen in the Resinous Forests. Most of the workmen in the forests are both small farmers and gum gatherers, the major portion of their revenues resulting from their work in exploiting the pine forests. In general, they are attached to the large proprietors by different forms of contracts. They usually receive half of the selling-value of the crude gum harvested by them. In the off-season, lasting from November to February, they are employed in thinning out the forests, etc., or in working on small farms owned or rented by them. They have organized a number of syndicates to protect their interests, those syndicates in turn forming part of the Federation of Syndicates of Gum Gatherers of the Southwest. (Federation des Syndicats des Gemmeurs du Sud-Ouest). The private forest owners have in turn organizations to protect themselves in their dealings with the public buyers and with the workmen's organizations. During the past four years, the labor situation in the forests has been satisfactory, due to the relatively high prices received for the gum.

The wages of the workmen in the forests naturally vary from season to season, depending on the selling value of the crop, the average wages being in the vicinity of 30 francs a day. As they are employed on a coöperative basis, there is an incentive to gather larger quantities of gum when the prices of that product are high. This factor aids in a certain measure in preventing the prices of the raw material from reaching excessive limits.

Coöperative Distilling Plants. Many of the producers are also distillers. Other proprietors have combined and have established their own distilling plants, thereby still further increasing competition for supplies of crude gum required by the manufacturers. The coöperatives are said to have proved very successful, producing at prices which easily compete with other distillers. At the end of the year, the profits are divided among the persons interested, according to the number of liters of crude gum supplied during the year. The coöperative plants have in the past, by reason of their nature, not been obliged to pay the usual business turn-over tax of 1.3%, but recent court decisions have obliged some of them to pay this tax.—(From Report of J. F. Butler, Assistant Commercial Attache, American Embassy, Paris).

Marketing the Crude Oleoresin. The situation with regard to supplies of the crude gum differs from that in respect to raw materials for most other industries, in that distillers are usually obliged to compete with each other to obtain sufficient supplies of the crude material to keep their plants going. When the first naval stores factors (stills) were established in France, the supplies of the crude material were abundant, and very cheap. As new plants were established, the area of the maritime pine forests was increased. However, during recent years, due to the increase in the number of plants, the extension of the plants and the introduction of new processes, the disparity between the available supplies of crude gum and the capacity of the plants has grown steadily greater and causes continual concern to the manufacturers. The manufacturers usually have a more or less loose agreement with the producers relative to supplies of gum, but often the bidding between the manufacturers increases prices to a point which is greater than the real value of the product, and therefore leaves little or no profit to the manufacturers.

Sometimes delivery is taken at the trees, but usually the crude gum is delivered direct to the factory. Payment is often made immediately on delivery, the price varying from one crop gathering to another (price varies at each dip).

The price is generally based on prices obtained as a result of public auctions of the product held by the communal authorities.—(Butler's Report).

Marketing of Naval Stores. Almost all of the French production of naval stores is sold through the naval stores bourses at Bordeaux and Dax. The manufacturers and merchants at Bordeaux are organized in the Syndicat du Commerce des Produits Resineux (Syndicate for Commerce in Resinous Products), founded in 1897. Trade in naval stores takes place each Monday and Wednesday at the Bourse, where the syndicate has its offices. The market is free, there being no special rules relative to trading. Business is done under private contracts between sellers and buyers. After the closing of the Bourse each day, an average quotation for turpentine is fixed by a committee composed of sworn brokers, one merchant and one manufacturer. The committee is presided over by a member of the Bordeaux Chamber of Commerce having no interest in naval stores. However, if sales during the day are less than 24,000 kilos, no average quotation is fixed. The operations with respect to the Bourse at Dax, which is held on Saturdays are practically the same as those at Bordeaux. (There is more rosin sold at Dax than at Bordeaux). The Bordeaux manufacturers and merchants usually participate at the Dax Bourse.

There is no set practice with regard to sales. Manufacturers may sell either through brokers, wholesalers, or direct to consumers, an important part of the sales being of the last-named sort. Selling is almost entirely on a cash basis.

The dry products are shipped in cheap barrels made of local pine, some of the manufacturers having cooperage shops in their plants which supply all of the barrels needed. The turpentine is shipped in barrels (really steel drums), although the practice is growing of shipping turpentine in tank cars containing 12,000 liters, resulting in a big economy in handling and transportation charges.

Lack of Definite Grade Classification of Rosin. French trade in rosins is greatly hampered by the lack of a definite and precise classification with respect to grades. Most of the manufacturers, in order to protect themselves, prefer to sell without guaranteeing the exact grades of their rosins, indicating the grades only in a rather general way. This situation is taken advantage of by the buyers in England and in Germany who collect lots of rosins in France for reclassification and resale at higher prices. (I do not believe that this is quite exact, because, as far as I could find the French do not use the American types up to W. W.; it is only for the grades above W. W. which are not standardized. The French have nine different types above W. W. though only the lowest seven are recognized in the trade.—W. L'E. B.)

Le Comptoir de Vente des Fabricants Landais de Produits Resineux. (Selling Bureau of Manufacturers of Resinous Products in the Landes Region).

This organization was created in 1921, its object being to avert, through better coöperation between the manufacturers, a repetition of business depressions such as that which occurred in 1920 and 1921. The Comptoir now includes 35 manufacturers, who are share holders, the Comptoir handles almost all of the production of 15 other plants. In 1923, it handled 50,000 barrels of rosin and other dry products, or about two sevenths of the total French production. In 1922, it handled 35,000 barrels of dry products (rosins) and 2,400 tons of spirits of turpentine. Its capital is 2,000,000 francs, of which 1,200,000 francs are paid in. Export sales last year amounted to 32.5% of the total sales.

The direct purpose of the Comptoir is to eliminate intermediaries by selling direct to consumers. Many of its largest customers are shareholders. It has agents and correspondents in all of the principal cities of France, and in several foreign countries.

In general, its sales are made by order and for the account of its members. However, in special cases, it accepts the responsibility for the sales, particularly with regard to foreign accounts. All of the negotiations with the consumers, including payments, are handled by the Comptoir, and without the intervention of its members.

Production of Manufactured Products. France, which produces one-fourth of the world output, is second in rank after the United States in the manufacture of naval stores. The average annual production of spirits of turpentine is 25,000 tons, and of dry products (rosins) 85,000 to 100,000 tons. The domestic market consumes 15,000 tons of turpentine, and 35,000 to 60,000 tons of dry products.

The production has increased considerably since 1857, due to improved methods in caring for the trees, in the process of distillation, and because of the increase in home consumption, and in the export demand. A barrell of crude gum containing 340 litres now gives 74 kilos of spirits of turpentine, and 228 kilos of dry products, as compared with 60 kilos of spirits and 220 kilos of dry products in 1857.

Exports of Naval Stores. Exports of naval stores are made almost entirely through the port of Bordeaux. Exports have varied greatly during the past 25 years. In 1900, for example, they amounted to 27,790 metric tons, and in 1905, to 71,600 metric tons, falling to 17,749 metric tons in 1918, and mounting to 93,732 metric tons in 1921.

There are attached to this report tables showing exports and imports of naval stores by countries of destination, and of origin, for the years 1913, 1921, 1922, and 1923, and the first five months of 1924.

Exports of turpentine, rosins resins, pitch, resin lumps and other indigenous products during the past three years were far in excess of 1913 in quantity, and more particularly in value. Exports during the first five months of 1924 have been on almost the same relative basis as during a corresponding period of 1923. In 1913, the largest buyers of the products noted above were Germany, England, Belgium, Holland, Austria, and Italy. Importing countries in order of importance during the three year period 1921-1923 were Germany, Italy, England, Belgium, Holland, Poland, Switzerland, Austria, Denmark, and Norway. The United States also took appreciable quantities, consisting principally of very light grades of rosin.

Exports of spirits of turpentine during 1922 and 1923 fell off somewhat in quantity as compared with 1913. Before the war, the largest buyers were Germany, England, Italy and Switzerland. For the three year period 1921-1923, the principal importers were Italy, England, Switzerland, Belgium, Holland, Germany, Denmark, and Sweden.

1924 Crop Prospects. It is impossible so early in the year to secure a satisfactory estimate of the production of crude gum for the present season. Distillers refer to the long spell of relatively cool weather during the early part of the season as a factor, which, by retarding the flow of the gum, has tended to reduce the production. A recent circular issued by the Comptoir de Vente des Fabricants Landais de Produits Resineux, also indicates that the production will be limited. It is, in fact, rarely possible to predict with any great degree of accuracy the size of the crop until toward the end of the season. High or low prices of naval stores during the year may result in a corresponding increase in production, such as was the case in 1920. During that year, the number of workmen engaged in gathering the raw material increased from 9,000 to over 15,000. The total value of the naval stores produced during that year was estimated at 430,000,000 francs, as compared with 152,000,000 francs in 1921, and 211,000,000 francs in 1922. Further, the situation is always affected by the exchange, and the conditions in the United States, which dominate the world market prices. Based on the predictions given above, and considering present prices of naval stores, it would seem that this year's crop should be slightly less than that of last year.

The Institut du Pin. The Institut du Pin grew out of the Chemical Laboratory for the Study of Resins established in the Faculty of Sciences of the University of Bordeaux in 1900. The Institut was definitely created in 1922 for studying the following subjects:

1. Harvesting and treatment of crude oleoresin and utilization of by-products;
2. Industrial uses of spirits of turpentine, resins, etc., and of other derivatives;
3. Utilization of wood and waste products thereof.

Considerable progress has already been made in working out processes for the manufacture of wood pulp, synthetic perfumes, synthetic camphor, terpin and terpineol, ether, soap containing a high percentage of rosin, etc. In order to exploit processes worked out by the Institut, there is attached to that organization the Societe d'etudes et d'application pour le Progres de l'Industrie Resiniere (Society to Study and Apply Methods for Developing the Manufacture of Resinous Products). It is hoped that later on, the profits of the Society will be more than adequate to meet the expenses of the Institut. In the meantime, the Institut du Pin is supported by gifts from private individuals, and by subventions from the Government, and the Departments, Communes, and the Syndicates interested in the production of naval stores. (All of above from time reference is first made to it, is from Butler's Report.)

Turpentine Industry in Spain. Spain is third in rank in the world from the point of view of production of naval stores which equals 1/20 of that of the United States, and one-fourth that of France. Its importance in the European markets is constantly increasing. Following notes taken from study made by Mr. A. Carrera.

Historical Study: In Spain the industry is a very ancient one; it employed the system of cupping to death and distillation with primitive stills (for centuries).

But the industry such as it is today was only commenced in 1848 in a distillery at Hontoria del Pinar, province of Burgos.

Numerous difficulties prevented the development of this distillery, and of many others; the lack of communications, hostility of the inhabitants, and official resistance to the destructive methods employed.

In 1862, the brothers Falcon, of Mont-de-Marsan, with the help of Ruiz and Llorente, were able to install an important factory and introduce the Hughes method of bleeding the pines (French cup and gutter system). Their example was a stimulant to other factory owners and gave place to the installation of new factories.

The Franco-Spanish commercial treaty of 1879 ruined in great part, the Spanish industry, the French products competing successfully with the Spanish because of a reduction in the duty (from 2.30 pesetas the 100 kilos to .41 pesetas), and the difficulty and insufficiency of the transportation system in the Spanish turpentine regions. On account of this state of things arose the only logical solution to the problem, the Union of the Manufacturers of the Resinous Industry. This was the germ of the Union Resïnera Espanola, to which is due, thanks particularly to the efforts of the engineers Loriente and Nardiz, the development of the industry in Spain.

On the other hand, there exists a certain number of independent firms.

From Forestry Point of View: The species which are used in the industry are: Pinus maritima (Pinus pinaster, Soland), Pinus halepensis, Pinus laricio, and Pinus sylvestris given in their order of importance.

The Maritime pine produces nearly all of the gum. We refer to it each time we do not indicate the species treated.

The Aleppo pine, which is particularly esteemed, is the dominant species in the Mediterranean zone, in which are found Teruel, Valencia, and Murcia among other provinces, and the results which it gives will incite the inhabitants to a more methodical exploitation of this tree.

As for its production, it is not possible to give a figure which will express an average value, due to lack of methodical tests, but only some isolated figures.

In the commune of Puebla Larga, Province of Valencia, the cupping of 5,765 Aleppo pines, during the years 1917 and 1918 gave the following results.

	Total in kgs.	Production by Tree in kgs.
1917	16,800	2.913
1918	16,270	2.822

The results obtained by Senor Elorrieta, engineer of the Resinera Bilbaina (now amalgamated with the Unio Resinera Espanola), with the pines of the Province of Teruel, coincide with the notes given above.

In the impossibility to give all the characteristics of the exploitation of the four species cited, we will describe that of the Maritime pine which is, as has already been said, the most important of all, and we will refer in general to the central part of Spain, where the principal turpentine zone is found.

Because of the slower growth of the pine of Castile, compared to that of the Landes, and the adoption of incisions of 11 to 12 centimeters in width, the cupping for the pine of place commences between 40 and 50 years, and sometimes at a more advanced age. The tree then has a normal diameter of 30 centimeters. The slowness of the growth is due, among other causes, to the bad method formerly employed in the forests. It is possible, as a project of management states, that on changing these methods it will be possible to obtain the normal diameter at an earlier age.

The projects of management conceive in general, a cutting age of 80 years (rotation of 80 years).

It is the general practice to bleed the pines up to 80 years, figure adopted as an average, and the faces are commenced every 5 years, one succeeding the other without a rest period.

The pine forests of Castile differ radically from those of the Landes. In the former, what is first in importance is the gum, in the latter the main object is to get as much profit as possible from the wood, getting as good growth as possible from the trunk, which gives it a greater commercial value. (But this is true only of the French Government Forests.—W. L'E. B.)

This is one of the reasons why the cutting age adopted in Spain is more advanced than that of France.

The understanding of the necessity of revising the methods of management is increasing every day; a change must be made in the length of the rotation, dimensions of the face, and the practice of cupping all the pines to be thinned whenever the size of the tree will permit it—in a word, the plan of exploitation must be changed.

The cupping practice and the distillation practice, are done in substantially the same manner as they are done in the Landes, except for minor differences.

Distillation is done by the same processes, the steam process is very largely used.

A considerable part of the rosin produced is consumed in Spain. It is used in the paper factories, oil factories and distilleries, in wax, etc., but especially in the manufacture of soap.

Spain thus consumes 1,000 tons of spirits and 10,000 tons of rosin; the rest is exported. The principal markets are in Germany.

(Will send figures on production later.)

COMPARISON OF SOIL, TIMBER, LABOR, METHODS OF WORKING TIMBER, AND OWNERSHIP OF FORESTS BETWEEN FRANCE AND THE UNITED STATES

There is a striking resemblance between the Landes Region of France and the Naval Stores Region of the United States.

Like the latter, the country is very flat and the soil almost pure sand. In fact, as a whole, the soil of the southern coastal plain is better than that of the Landes; both the crops grown—corn being one of the principal ones,—and the growth of the timber show this. Under the top soil of the Landes is the same sort of hard pan found in the flatwoods of the Southern States.

Although the Maritime pine is faster growing after it reaches an age of ten or twelve years, our Slash or Cuban pine is faster growing in the same period and up to thirty years of age compares very favorably in growth with the Maritime pine. It has, however, several characteristics more favorable than those of the Maritime pine; unlike it, it is self-pruning, while pruning is one of the necessary operations in the culture of the Maritime pine of the Landes. But its most important point of superiority is that of producing practically no scrape, while the Maritime pine produces as much or more than Longleaf pine. Our southern region, of course, possesses the last named pine (more abundant than any other species) which produces very superior timber to that of the Maritime pine; the same can be said of the Slash pine.

Besides possessing two superior species of gum producing trees, our Naval Stores Region as a whole has a longer growing season, a hotter climate, which gives a more constant and at the same time greater flow of gum, and a greater amount of rainfall, which, according to Dupont, should give a greater percentage of spirits of turpentine in the gum.

However, our methods of working our timber are sadly inferior to those of France, while that country, perhaps, does not get as great a yield in a short period of time as we do; by its methods it has put its industry on a stable basis, which is far from the case in the United States.

The French method of paying the chippers has already been described.

The ownership of forest land in France, contrary to that which obtains in the United States, is in the hands of a large number of individuals. It has already been described in detail.

REMARKS OF THE COMMISSIONS

There are many things we can learn from France, if we take the pains to do so.

With a poorer soil, a poorer climate, a poorer species of tree, and far less money to work with, the French, during the same period of time, from 1857 to the present, have by their industry and conservative and reasonable methods put their industry on a stable basis, and have created an ever increasing market for their products. The very latest thing that they have done, which is already giving fine results, is the creation of the "Institut du Pin," a research station that is not only aided by the Government, *but by the whole French Naval Stores Industry.* Nothing of this kind has been done by the American Industry, although we have an efficient Forest Service which has always been ready and willing to aid the industry if called on. But instead of taking the intelligent attitude of the French, the producers of our country, as a whole, have looked with suspicion and distrust on any work of the Government. Even now, due largely to the efforts of Senator Fletcher of Florida, an appropriation of $50,000, many times that with which the French Institut de Pin is functioning successfully, has been appropriated for a Forest Experiment Station in the Southern Pine Region. It is up to the Industry to get behind this and *help it* and *use it.* Unless this is done the Industry will not progress.

Perhaps it is not very well known that one of the principal reasons why some of the large soap manufacturers have ceased to use rosin in their soap is not because they found better substitutes, but *because they could not be sure of a future supply of rosin for their ever-growing business.*

Another forward movement in France, worthy of the attention of the American producers, is the formation of a Rosin and Turpentine Exchange *which sells largely to the customer*—some of the largest soap manufacturers of Marseilles are its customers. It started with a capital of 50,000 francs in 1921 and now has a capital of 2,000,000, most of which is paid in, and it is still growing.

Still another important change in the Industry in the Landes Region is the formation of a number of very successful coöperatives of forest owners who have grouped together to erect and run their own stills. These coöperatives function very much like our Tobacco and Citrus Coöperative Exchanges. It is to be noted, too, that a number of these coöperatives are members of the Rosin and Turpentine Exchange already mentioned.

The French method of paying the chippers could be copied with benefit in this country. The French chipper, who also dips and hauls the gum to the still, is paid half the market price for the gum he collects. He shares the risks of the business with the forest owner, which is not the case with American labor, which is paid a fixed price per face for the whole season, no matter what state the market may be in at any time during the season.

It is questionable with the present state of the market for rosin, whether it would pay to adopt immediately the French method of bleaching their rosin, but this, undoubtedly, can be done in the future, together with the adoption of the improved French methods of steam distillation when the Industry sees fit to organize; as it must do or go under.

To repeat, whether it supports the Government Forest Experiment Station, or whether it founds a research laboratory and Station of its own, there is no doubt of the fact that such an institution is absolutely needed by the Industry and should be supported by every branch of it. We should have in the United States an Institute of the Pine corresponding to the French Institut du Pin.

And we must *advertise*. Unless the public is shown that turpentine is a superior ingredient in paints, and in the other products in which it can be used, it will be content to use products made with substitutes. It is a fact, in spite of the indifference to it on the part of many producers, that the only way to sell an article these days is to *advertise it,* and we must advertise both turpentine and rosin.

But the most important of all, is the adoption of a more conservative way of chipping *young* timber. The old timber must be cut, and it is more or less up to the individual to use whatever method he wishes when he cups such timber, but the present practice of destroying young timber by extravagant chipping is absolutely suicidal for the Industry. Some system of management like that used in France, but modified to meet our local conditions, must be adopted. Such a system of management has already been worked out successfully on the Florida National Forest by Assistant Supervisor McKee. We quote from him:

"On basis of yield per acre the French system shows best results with an increase of 46 per cent in production over the Government system. This owing to the fact that trees of smaller diameter may be worked without damage and with profit, and thus increase considerably the number of producing faces. On timber of practically the same density of stand the French method cupped 39.90 cups per acre and the American 14.95. At this rate 250 acres will cup a crop of French faces, as against 670 acres that will be required to cup a crop under the regular Government method.

The records show that on the basis of yield per square inch of surface worked the difference between the yield is very small, with the French method in the lead. Had the smaller diameter trees been cupped in the American drift the yield per square inch of surface would undoubtedly been smaller.

Conclusions based on the experience gained in this operation are that Long Leaf and Slash pine of mature age which have already reached saw timber size can best be worked under the Government method of cupping and chipping, which allows of a profitable working for 14 years without damage, and the second growth long leaf and slash pine 6 to 8 inches up can be more profitably worked according to the French system because it will allow a much longer working. All during the time, in fact, the tree is growing from the 6 and 8 inch to the 14 inch or larger size, when it becomes ready for saw timber.

On an extensive operation where labor would be familiar with the methods to the extent that chipping could be carried on with more regularity and on timber suited to the method, there is no reason to believe but that the yield per face would compare more favorably with the American method and produce a greater yield per square inch of exposed surface. The chief virtue of the French system, however, is the long period over which an operation can be conducted. Thus stabilizing an important and fast disappearing industry and insuring for the individual operator a continued and profitable operation on the same area over a period of 30 or 40 years.

W. L'E. BARNETT,
Secretary Naval Stores Commission.

Mt. Dora, Florida.

PROPOSED PLAN OF NAVAL STORES INSTITUTE

By O. H. L. WERNICKE

Gulf Point, Fla., January 13, 1925.

Mr. Joseph Hyde Pratt,
Asheville, N. C.

Dear Mr. Pratt:

This will acknowledge your notice of December 12, regarding the Forest Congress meeting at Little Rock January 19-21. I am also in receipt of a letter from Mr. J. G. Pace, of Pensacola, urging me to attend, and I should be glad to do so if it were not for conflicting engagements.

I am busily engaged with matters pertaining to the Pine Institute of America, which is the outcome of the get-together meeting* of Naval Stores interests last February at Savannah. Another Conference to be held February 19, 21, 1925, at Savannah, has been called to act on the Institute proposal and other important matters. I will include herewith a copy of the plan as adopted by the organization committee and a memo of the arguments which influenced its members.

---

* This get-together meeting of men interested in the Naval Stores industry was brought about through the appointment of a Naval Stores Committee by the Sixth Southern Forestry Congress.

I particularly regret my inability to be with you at Little Rock because of the intimate relations existing between Forestry and Naval Stores, and trust that you will find opportunity to explain the Pine Institute plan to your people and extend an invitation to all interested persons who attend the Congress to come to Savannah in February and lend their aid to the biggest project ever proposed for the South.

You will note that the Institute plan does not seek to displace any other existing or future organization or activity, but is devised to augment and coördinate all lesser movements by providing a permanent and responsible agency that can give added emphasis and practical support to every worthy effort.

With kindest personal regards, I remain

Sincerely,

O. H. L. WERNICKE.

ARGUMENT FOR A PINE INSTITUTE OF AMERICA

The one big job of the South is to make better use of its idle lands; what to do with them, and how to do it, are serious problems which concern everybody, because they affect all persons and every business in the territory, and more particularly those who own them. The health, vigor, and culture of its people and their place in the realm of human progress towards better living conditions can not rise higher than the degree of intelligence exercised in making better use of its lands, because the cut over territory has no other great natural resources.

The most that we have is our land, and therefore, the most we can hope to accomplish is to use this land to best advantage. Its known possibilities are beyond description; it presents no obstacle that can not be removed by good understanding, while made to pay its own way.

Unless a thing is profitably done, it is a waste of energy and not worth doing. Knowledge that cannot be used is an ornament of no value. Good education consists in knowing what to do, and good ability, in knowing how to do it profitably. Knowledge and ability are neither gifts nor endowments, they must be acquired and cultivated. This can best be done by organized coöperation under wise directions and skillful management.

We regard with satisfaction our schools, our churches, libraries and colleges, from which we derive scholars, preachers and teachers, lawyers, doctors, and artisians, to whom we turn for counsel or aid in a multiplicity of daily problems, and to maintain which, we assess ourselves for sums of money which represent a large share of our yearly income. We do this more or less cheerfully, because it has long been the custom so to do, and those established agencies serve useful purpose including relief for toothache, but they do not adequately serve the man who has the purse ache which comes from tax payments on idle land. That is the one really big ache with which the cut-over sections of the South are presently afflicted and for which remedies are urgently desired.

If we found ourselves without churches, schools, or doctors, we would immediately get together and provide them at any cost, so also must we get together and provide ourselves with proper and efficient means to kill the hook worms that make waste places of our soil; it can be done at small cost and little effort while yielding returns beyond comparison.

Without land and favorable climate we cannot have trees; without pine trees we cannot have rosin, turpentine, lumber or fuel, and without such products we cannot have permanent prosperity or enjoy modern living conditions, and without these we must become a backward people. These obvious deductions challenge us to meet the issue, not in a spirit of resignation or self preservation, but with that keen zest for achievement which inspires every normal being.

The Pine Institute of America, as outlined in the plan devised by the committee charged with that duty, provides an agency to be owned and controlled by those whom it is to benefit primarily, and where the basic problems which are beyond individual solution can be solved or evaluated by the added forces of expert skill and coöperation.

Like the hub of a wheel its many spokes can be made to coordinate with every fount of useful knowledge within the radius of all organized industry including the government, our universities, and private research agencies, and bring them to bear on our particular problems. Here at the hub the kernels are sifted from the chaff before sending them out again in usable form over another set of spokes that reach the men who can be benefited thereby.

The form of organization is important, but the quality of its management is vital. A gun shoots no higher than it is aimed and when it fails to hit the mark the result is a waste of ammunition. It is dangerous to hunt bear with bird shot, and foolish to use buck shot on quail, the load must be suited to the game and discharged with ability to hit the mark to insure good results.

The plan must be flexible to meet changing circumstances, it must be broad enough to include the ordinary needs of its members with fairness and comprehension, and it must be given permanent financial support sufficient to carry out its objects and purposes. Such a plan so financed and supported will pay dividends from the hour of its adoption, because it is a necessary machine in the process of reducing the problems in mind to orderly proportions.

Organized knowledge has always and everywhere been the foundation of progress in all departments of human endeavor. It will not fail us in this case, in proof we need only to remember that its pine region, now the richest of France, was malarial swamp and barren sand before organized knowledge was brought to bear on the situation less than a century ago. The cut over pine areas of the South are neither swamp nor unfertile sand, here we have soil and climate that grows timber faster and with less human effort than elsewhere and here is where organized knowledge can be most profitably applied.

Confidence is the foundation of credit, and good credit aids progress. There are inexhaustable reservoirs of capital awaiting southern enterprise when it feels assured of safety with profits. No agency can do so much to bring this about as can the Pine Institute of America supported by the great landowners and leaders in related industries all the way from Texas to Virginia.

With the men who represent the primary resources of the Coastal plain solidly behind the Pine Institute, that will in itself, be an event of sufficient import to focus nation wide attention on the territory and gain for it free publicity of greater values than any amount of paid advertising would produce.

When properly supported and ethically conducted the Institute can have an advisory council composed of the foremost scientists and experts from industrial, financial and educational institutions and thereby gain access to all the sources of modern progress and influence. Such men freely give their best where worthwhile public service can be rendered, but they cannot be hired for money or persuaded by halfway measures.

The chosen field for this institution is unoccupied, its scope is empire wide and its opportunity without limits. In this obvious situation the spirit of our finest traditions now challenges the courage of our convictions to make history that shall eclipse the glories of an older South in its culture, wealth and influence.

WHAT OF A LOCATION

When the Pine Institute of America has been organized as a going concern and its trustees empowered to shape its course where the most good can be done, their next problem will be to provide a home for it wherein the stated objects and purposes can be realized.

The fortunate selection of a location and suitable quarters are matters of supreme importance and deserve more than casual consideration, because of the far flung membership the geographical aspects of the case deserve particular attention. To properly accommodate the personnel and business of such an Institute with its multiplicity of departments devised to function with the sources of useful knowledge from many public and private sources, and the service bureaus required to aid its supporting members in the best possible use thereof are matters that cannot be definitely determined in advance, but we may safely assume that the space and facilities required will be considerable and that room for expansion must not be lost sight of.

To house and accommodate the activities of such an Institute in any of our larger cities involves expenditure for office rentals as well as for the higher living costs of its officials and employees, which can in no way be translated in terms of equivalent service. These extra burdens would have to be supported out of institutional funds for which better use can be found.

The character of such institutional work can derive no advantage from urban environment; it relates particularly to open air problems and calls for men in boots who thrive best next to nature and on top of their jobs, such a location entails a minimum of expense and makes the stronger appeal to those who can render most valuable service.

It is conceivable, that aside from the natural advantages offered by a location in the woods as it were, the saving in expenses may easily amount to a sum sufficient to pay interest and taxes on a large tract of land and the kind of improvements best suited to the needs and purposes of the institute.

In this situation the business and personal housing problems are resolved into simple forms without the restrictions imposed by cities. Here officers and employees may own their homes and gardens, and enjoy community comforts, and advantages denied to city folks, here also, the supporting members of the institute can have practical object lessons while enjoying a delightful outing at no great cost. The Pine Institute, resembling somewhat a great university in the woods, will be able to show that land can profitably be reforested and otherwise made a paying investment and if given sufficient land for such developments the Institute will in time become self sustaining, and probably have property worth more than all the dues paid into its treasury.

Fifty thousand acres of cut over land when developed to its maximum productiveness may easily become worth a hundred dollars per acre, or a total of $5,000,000. This land may now be acquired and given all neded improvements for a comparatively modest sum, and the carrying charges can be easily met from dues until such times when sufficient revenues from the property shall become available.

The Institute in the piney woods is an alluring suggestion with many persuasive arguments in its favor. What could be more inspiring for the youth of the South or more convincing to capital from afar, than a living example of accomplishment by the intelligent use of land now regarded as almost worthless, of which there are untold millions of acres, and more to follow as the trees fall before the axe of the lumberman.

Actual demonstrations conducted on a commercially profitable basis are worth more than all the academic theories and unproven methods ever invented. What is wanted of an Institute, supported by land owners, turpentine producers, and others, are tangible and convincing proofs that its work and teachings pay dividends, anything less than that has no value and is not worth doing.

People in France have been growing pine trees for a hundred years and everybody connected with the industry has prospered. We have more and better land, also finer, faster growing trees than they, but we are lacking in technical understanding of their success. We need some place where we can learn by seeing things done, we want a sort of "Chautauqua," not of generals or experts alone, but of landowners, turpentine operators, wood distillers, naval stores factors, dealers, and exporters, and of other people including the young folks. We want a place for both instruction and recreation, that has something to offer besides tango teas and jazz bands. The Pine Institute of America can make for itself, a place of nation wide esteem by doing the obvious things which now are calling for help.

An attractive place for the Institute where its members will find opportunity to enjoy a comfortable outing with their families and friends while they are learning things of value to themselves and others, would do much to insure its success by achieving more than its proponents have in mind or can anticipate.

The success of the Institute itself depends on intimate personal contact of its supporters, its trustees and its other employees. Those who pay the dues do not care for pretty views from the top floor windows of a city office building or learned bulletins filled with technical language and dizzy statistics. These supporters want to see and learn things that they can take home and use to advantage. They want some place where their troubles and problems are understood and where helpful answers can be given.

The officers and experts in charge of the Institute also need daily and intimate contact with the practical men who have problems to be solved, this important contact will not be realized if the Institute is located elsewhere than in the field on land under its own control.

Your committee believes that the plan for the institution is broad enough to cover every contingency and that no lesser organization would be of lasting benefit. Under the plan devised, every class of interested persons or of local associations will find aid and opportunity to do better work and accomplish more than they could otherwise do.

PINE INSTITUTE OF AMERICA

1. *Objects and Powers*

(a) To found, and to conduct upon scientific principles, an engineering and chemical institute which shall serve and advance the legitimate interests of the owners of cut-over lands, the producers of gum, rosin and turpentine, and of factors handling the same, and of dealers and brokers therein and exporters thereof, the manufacturers and distributors of wood tar products, the manufacturers of wood rosin and wood turpentine, and bankers, real estate dealers and others interested in such lands and products.

(b) To study and develop reforestation of cut-over lands, and means and methods of utilizing said lands most advantageously to those interested therein.

(c) To coördinate in a legitimate way the efforts of those interested in the utilization of such lands and in the production, handling, sale, distribution and export of such products.

(d) To conduct chemical and other tests and experiments designed to increase the uses of and expand the markets for such products.

(e) To gather and assemble, and to distribute to those interested therein, dependable and serviceable information and statistics relative to such lands and products and the disposition and uses thereof, and regarding laws and trade customs and practices relating to, and patents and processes having reference to any of such products.

(f) To provide, as an instrumentality of service, an available agency and medium through which those interested in such lands and products may establish business relations and social contact with one another whereby the legitimate interests of all may be advanced.

(g) To employ, and to utilize the services of such trained experts in engineering, chemistry and kindred sciences, and other persons, as may be requisite or proper in furthering the aims and accomplishing the objects of the organization.

(h) To own such real and personal property as may be necessary or appropriate to the carrying out of the above objects.

2. *Plan*

(a) There will be no capital stock.

(b) The Institute will not be conducted for profit. It is to be a service institute whose activities will be for the general benefit of its membership and of the public at large.

(c) It will be managed by a Board of Trustees representing the several classes of members, each class to have equal representation on the board.

(d) The several classes of members will be: (1) Landowners; (2) producers of gum spirits of turpentine and gum rosin and of the crude gum from which the same are made; (3) factors handling products mentioned in subparagraph 2 above; (4) dealers, brokers and exporters handling products mentioned in subparagraph 2 above; (5) manufacturers of wood tar products; (6) manufacturers of wood rosin and derivatives thereof; (7) bankers, real estate dealers and others interested in lands or in forest products, or the better utilization thereof.

(e) One-third of the first Board of Trustees will be chosen for one year, one-third for two years, and one-third for three years. Thereafter the Trustees will be elected for a term of three years. There will be an Executive Committee of the Board composed of one Trustee from each class.

(f) Elections for Trustees will be conducted by mail.

(g) Trustees will draw no salaries but will be paid a per diem plus traveling and hotel expenses for attending meetings.

(h) Compensation and duties of all officers, agents and employees will be fixed by the Board of Trustees.

3. *Planning*

(a) Membership dues will provide funds for conducting the affairs of the Institute.

(b) All members will be required to sign a ten year membership contract, transferable by the member, with the approval of the Institute, to another in the same class to which the member belongs.

(c) Class 1 members will pay one cent per acre per year.

(d) Class 2 members will pay five cents per barrel of spirits and rosin sold.

(e) Class 3 members will pay one cent per barrel of spirits and rosin handled.

(f) Class 4 members will pay one cent per barrel of spirits and rosin sold.

(g) Class 5 members will pay six cents per barrel sold.

(h) Class 6 members will pay six cents per barrel sold.

(i) Class 7 members will pay such rate or rates as the Board of Trustees may determine.

4. *Officers*

The Officers of the Institute shall consist of a President, one or more Vice-Presidents as the Board of Trustees may determine, a Secretary and a Treasurer and such other officers as the Board of Trustees may deem proper.

The offices of Secretary and Treasurer may be held by one and the same person, in the discretion of the Trustees.

The office of the Secretary shall be located permanently in one city, so that the place of business may become well established and well known to all the members and to the public at large.

All officers shall be elected by majority vote of the Trustees and shall hold office at the pleasure of the Board.

5. *Corporate Organization*

The Institute will be incorporated under the laws of the State of..and have its official headquarters and the office of the Secretary in the City of..................
....

RESOLUTIONS ADOPTED BY SEVENTH SOUTHERN FORESTRY CONGRESS

1. CLARK-MCNARY LAW: APPROPRIATION

Whereas, the United States Congress in the passage of the Act of June 7th, 1924, known as the Clarke-McNary Law, has provided for a wide extension of Federal coöperation with the States, and has authorized yearly appropriations as follows:

(1) $2,500,000 for the prevention and suppression of forest fires, and for studies of forest taxation and timber insurance,

(2) $100,000 for the distribution of planting stock for reforestation of farm woodlands, and

(3) $100,000 for assistance to farmers in the handling of their timber crops; and

Whereas, the Federal Budget Bureau recommended for the next fiscal year an appropriation of only $660,000 under the first item and appropriations of $50,000 for each of the two remaining items, which recommendations have been approved by Congress, and are included in the recently passed Agricultural Appropriations Bill; and,

Whereas, the sixteen member States of the Southern Forestry Congress are among the most important timber States in our country, but now contain more than one-third of the country's idle forest lands, though these can be converted into one of the greatest assets of the South and of the United States by protection and reforestation, which can best be encouraged through Federal aid authorized by the Clarke-McNary Law; but, for such purposes of restoration, the share of these States from annual appropriations of only the above amounts will be utterly inadequate; therefore, be it

Resolved that the Seventh Southern Forestry Congress urges the immediate appropriation by the Federal Congress, at the opening of its next session, of deficiency items for the fiscal year 1925 to bring each of the two farm forestry sections up to the $100,000 authorized, and an item of $340,000 to bring the fire coöperation fund up to the minimum of $1,000,000 urgently recommended by the Senate Select Committee on Reforestation, and endorsed by the Agricultural Committee of the House, and that the appropriation for this purpose for the fiscal year 1926 be raised to $1,500,000, and the farm forestry items be each continued at the $100,000 basis authorized; and be it further

Resolved that a copy of this resolution be sent to the President of the United States, and to each member of the Senate and House appropriations sub-committees having charge of the Agricultural Appropriations Bill for the fiscal year beginning July 1, 1926, and to all members of the Congress of the United States from the sixteen States comprising the Southern Forestry Congress.

2. CLARKE-MCNARY LAW: LIMITATIONS

Whereas, Sections Four and Five of the Act of June 7, 1924, known as the Clarke-McNary Law respectively limit the distribution of forest planting material, and assistance of handling of forest properties, to farm lands exclusively; and

Whereas, there is a growing interest in the establishment of forests by counties and municipalities not only for timber production, but also for watershed protection; therefore, be it

Resolved that the Southern Forestry Congress urges the amendment of Sections Four and Five of this law, so as to remove such limitations and extend the coöperation authorized to idle forest lands owned by counties and municipalities.

3. CLARKE-MCNARY LAW: CO-OPERATION

Whereas, the Clarke-McNary Act was written, supported, and cast as a forestry law; therefore, be it

Resolved that the Seventh Southern Forestry Congress urges that all Federal Funds made available for coöperation in forestry with the various States be expended as heretofore, through the regular State Forestry Departments where such exist.

4. ACQUISITION OF LANDS FOR NATIONAL FORESTS

Whereas, the Congress of the United States in passing the Clarke-McNary Bill last session, has broadened the scope of the Weeks Law of 1911 and committed the government to a policy of purchasing lands for National Forests on the water-sheds of navigatable streams, and

Whereas, the American Forestry Association has suggested a program for the consideration of Congress which involves the expenditure of \$3,000,000 per year for five years and \$5,000,000 per year for the succeeding five years for the purpose of establishing a system of National Forests in the eastern half of the United States; now therefore, be it

Resolved that the Southern Forestry Congress endorses a program for the acquisition of lands for National Forest purposes under Section Six of the Clarke-McNary Law as outlined by the American Forestry Association, and embodied in the present McNary-Woodruff Bill.

5. FOREST SERVICE RESEARCH

Whereas, we recognize that the safety of investments in forest raising cannot be assured without definite, detailed, and reliable information upon all phases, and that this can be satisfactorily secured only as a result of systematic forest investigtions such as are being carried on in the coastal pine region by the Southern Forest Experiment Station and the Appalachian Forest Experiment Station and generally by the Forest Products Laboratory; be it

Resolved that we urge upon Federal and State Legislators, upon all State Forestry Departments, educational institutions, associations, and forest land owners in the States concerned, the necessity of enlarged facilities for forest investigations, particularly funds and coöperative participation in the work of the two Stations and of the Laboratory.

Be it further resolved that copies of this resolution be brought to the attention of Federal and State Legislators of the Southern States.

6. STATE FORESTRY DEPARTMENTS

Whereas, forest protection and the reforestation of idle lands can best be encouraged and stimulated through organized effort on the part of the public, represented by the States, in coöperation with the United States Forest Service; therefore, be it

Resolved that the Southern Forestry Congress assembled in its Seventh Annual Meeting at Little Rock, Arkansas, urges the Southern States, which have not already taken such action, immediately to adopt a State forestry policy to include in the main:

(1) A non-political State board or commission representing the forest and other interests which may be chiefly concerned to supervise the development of State forestry work under the immediate direction of a trained and competent Forester,

(2) The establishment of a forest fire protective system,

(3) Provisions for encouraging and inducing private participation in reforestation through coöperation with public agencies, and

(4) Provisions for properly financing the State's forestry department and work.

7. APPRECIATION

Resolved that the Seventh Annual Southern Forestry Congress hereby expresses its appreciation and thanks:

To the Honorable Tom J. Terral, Governor of Arkansas for his cordial welcome to the members attending the Congress, and for his strong endorsement of its purposes:

To the City of Little Rock, to the Press, Hotels, and Citizens for the many courtesies extended to the Congress and its Delegates during their stay in Little Rock:

To our President J. S. Holmes, and our Secretary W. K. Williams for the splendid condition of this organization; to all who have contributed to its support, and to those who have presented the splendid papers, and participated in the discussions:

To the Honorary Arkansas Forestry Commission, the Arkansas Soft Pine Bureau, and the Southern Pine Association for their helpful coöperation.

To the Missouri Pacific Railroad, and to the Chamber of Commerce of Hot Springs, Arkansas.

W. D. TYLER, *Chairman.*

REPORT OF THE COMMITTEE ON PLACE OF MEETING

TO THE SOUTHERN FORESTRY CONGRESS:

Your Committee appointed to consider invitations for holding the 1926 annual meeting, and recommend the place of meeting, respectfully reports. The Committee had before it invitations from Alexandria, La., Asheville, N. C., Jacksonville, Fla., Richmond, Va., and Louisville, Ky. After careful consideration the Committee by a unanimous vote, recommends that the 1926 annual meeting be held in Richmond, Va.

JAMES BOYD, *for the Committee.*

The report was approved and Richmond, Va., was selected as the place where the eighth Southern Forestry Congress will be held.

REPORT OF THE COMMITTEE ON NOMINATIONS

The Nomination Committee, through the Chairman Mr. E. O. Siecke, presented the following names for officers of the Congress:

For President: Mr. Horace L. Tilghman, President, Tilghman Lumber Co., and of the South Carolina Forestry Association, Sellers, S. C.

For Vice-President: Dr. A. C. Millar, Secretary, Arkansas Honorary Forestry Commission, Little Rock. Ark.

For Secretary-Treasurer: Mr. W. K. Williams, Forester, Crossett Lumber Company, Crossett, Ark.

For Assistant Secretary: Mr. A. B. Hastings, Assistant State Forester, Charlottesville, Va.

For Chairman Executive Committee: Mr. W. D. Tyler, Clinchfield Coal Corporation, Dante, Va.

These gentlemen were then duly elected to fill these positions for the ensuing year.

The Seventh Southern Forestry Congress then adjourned.

Appendix I

PATRONS*

SEVENTH SOUTHERN FORESTRY CONGRESS

ALABAMA

Kaul Lumber Co., Birmingham.
Horse Shoe Lumber Co., River Falls.
Vredenburgh Saw Mill Co., Vredenburgh.
Jackson Lumber Co., Lockhart.
W. P. Brown & Sons Lumber Co., Fayette.
Scotch Lumber Co., Fulton.
W. M. Carney Lumber Co., Atmore.
Pioneer Lumber Co., Elrod.
Deal Lumber Co., Buhl.

FLORIDA

Pensacola Lumber & Timber Co., Pensacola.
Burton-Schwartz Cypress Co., Perry.
Southern States Lumber Co., Pensacola.
Pensacola Tar & Turpentine Co., Bull Point.
Florida Development Board, Jacksonville.
Alber Sullivan Co., Century.
G. Florida Sawmill Association, Jacksonville.
Putnam Lumber Co., Jacksonville.
Bond Lumber Co., Glenwood.
Escambia Lumber & Manufacturing Co., Pensacola.

LOUISIANA

Southern Pine Association, New Orleans.
Gulf Lumber Co., Fullerton.
Industrial Lumber Co., Elizabeth.
Krause & Managan Lumber Co., Westlake.
Louisiana Forestry Association, New Orleans.

---

* Those who make substantial contributions towards the expenses of the Congress are termed patrons. These persons, firms and Associations contributed a total of $863 in sums varying from $10 to $50 towards the expenses of the Seventh Southern Forestry Congress.

MARYLAND

E. E. Jackson Lumber Co., Baltimore.

MISSOURI

Exchange Sawmills Sales Co., Kansas City.
Dierks Lumber & Coal Co., Kansas City.
Ingham Lumber Co., Kansas City.
Caddo River Lumber Co., Kansas City.
Central Coal & Coke Co., Kansas City.
The Long-Bell Lumber Co., Kansas City.
Commercial Journal Co., St. Louis.
J. H. Allen, St. Louis.

TENNESSEE

Turner Farber Love Co., Memphis.
E. Sondheimer Co., Memphis.
R. J. Darnell, Inc., Memphis.
Anderson-Tully Co., Memphis.
E. L. Bruce Co., Memphis.

VIRGINIA

W. D. Tyler, Dante.
Clinch Valley Lumber Corporation, Tazewell.
Pocahontas Coal & Coke Co., Roanoke.

WEST VIRGINIA

C. L. Ritter Lumber Co., Huntington.

Appendix II

LIST OF REGISTERED DELEGATES

ATTENDING THE

SEVENTH FORESTRY CONGRESS

Adkins, J. R	Bald Knob, Ark.
Allen, J. H	Hoo Hoo, St. Louis, Mo.
Allen, Shirley W	Forester, American Forestry Ass'n., Washington, D. C.
Aylin, A. W	General Freight Agent, Mo. Pac. Ry., Little Rock, Ark.
Baily, Carl E	Arkansas Commissioner Mines, Mfgrs., and Agri., Little Rock, Ark.
Baker, Eugene	A. & W. P. Ry., Atlanta, Ga.
Baldwin, W. L	Southern Lumber Co., Warren, Ark.
Barnett, W. L'E	Pres. Florida Forestry Ass'n., Mt. Dora, Fla.
Baxter, C. E	Long Bell Lumber Co., Sheridan, Ark.
Beidleman, L. P	E. L. Bruce Co., Little Rock, Ark.
Bohlinger, M. S	S. H. Bohlinger Lumber Co., Shreveport, La.
Boyd, James	Lumber Trade Journal, New Orleans, La.
Bruner, E. Murray	U. S. Forest Service, Asheville, N. C.
Buchner, C. A	Freeman Smith Lumber Co., Camden, Ark.
Bunker, Page S	Alabama State Forestry Commission, Montgomery, Ala.

Butler, Geo. E	Norfolk & Western Ry., Memphis, Tenn.
Calhoun, C. A	Crossett Lumber Co., Crossett, Ark.
Cannon, B. A	Gates Lumber Co., Wilmar, Ark.
Chalmers, High	Crittenden Lumber Co., Earle, Ark.
Cook, A. B	Wisconsin - Arkansas Lumber Co., Malvern, Ark.
Cousins, W. R	East Texas Mill Mgrs. Ass'n., Beaumont, Texas.
Cowles, C. A	Norfolk & Western Ry., Atlanta, Ga.
Dunlap, Frederick	Sec'y Missouri Forestry Ass'n., Columbia, Mo.
Edwards, Russell T	American Tree Ass'n., Washington, D. C.
Edwardes, Vance P	Forest Products Laboratory, Madison, Wis.
Ellis, Jno. W	Eldorado Lumber Co., Camden, Ark.
Evans, C. R	Crossett Lumber Co., Crossett, Ark.
Fannon, R. W	Green Bay, Wis.
Foley, J. F	Mansfield Hardwood Lumber Co., Shreveport, La.
Forbes, R. D	Director Southern Forest Experiment Station, New Orleans, La.
Galloway, J. J	Henderson Brown College, Arkadelphia, Ark.
Gammill, G. P	Edgar Lumber Co., Wesson, Ark.
Gates, D. C	Fordyce Lumber Co., Fordyce, Ark.
Gates, E. W	Crossett Lumber Co., Crossett, Ark.
Gilliam, R. A	Dallas, Texas.

Gravette, Marshall	Poinsette Lumber Co., Harrisburg, Ark.
Holcomb, B. E.	Ayer & Lord Tie Co., Little Rock, Ark.
Hardtner, Henry E.	Urania Lumber Co., Urania, La.
Hall, Wm. L.	Hall, Kellogg & Co., Chicago, Ill.
Hamlen, Joseph R.	Chairman, Hon. Forestry Commission, Little Rock, Ark.
Hampson, F. W.	Norfolk & Western Ry., Little Rock, Ark.
Hollas, Carl	Hon. Forestry Commission, Warren, Ark.
Holmes, J. S.	N. C. State Geological and Economic Survey, Raleigh, N. C.
Harlin, J. L.	Wabash Railway, Little Rock, Ark.
Hurst, E. B.	U. S. Forest Service, Hot Springs, Ark.
Israel, Albert R.	Southern Pine Association, New Orleans, La.
Johnson, Fremont L.	Mena, Ark.
Johnson, H. E.	Denver, Colo.
Jones, Chapin	Virginia Forestry Department, Charlottesville, Va.
Jones, W. G.	Texas Forestry Ass'n., Waco, Texas.
Kenkel, G. H.	Brinkley, Ark.
Kerr, Charles M.	Amer. Wood Preservers Ass'n., Chicago, Ill.
Koen, H. R.	Ozark National Forest, Russellville, Ark.
Clark, J. G.	Arkadelphia, Ark.
McKinnon, A. W.	Mackinnon Lumber Co., Shreveport, La.
Martin, H. G.	Little Rock, Ark.
Martin, J. H.	Little Rock, Ark.

Mayhew, B. A.	Fordyce Lumber Co., Fordyce, Ark.
McCrory, Frank	Rock Island Railway, Little Rock, Ark.
McSweyn, Geo	E. L. Bruce Co., Memphis, Tenn.
Meyer, A. E.	Missouri Pacific Railway, St. Louis, Mo.
Millar, A. C.	Secretary Hon. Forestry Commission, Little Rock, Ark.
Morris, L. L.	Crossett Lumber Co., Crossett, Ark.
Morris, Wm. W.	P. B. Nursery, Inc. Pine Bluff, Ark.
Norman, W. S.	Ark.-Vancouver Timber Co., Hamburg, Ark.
Paul, H. A.	Missouri Pacific Railway, Little Rock, Ark.
Perez, Leonard	Missouri Pacific Railway, St. Louis, Mo.
Peters, J. G.	U. S. Forest Service, Washington, D. C.
Plymale, C. H.	Supervisor Arkansas National Forest, Hot Springs, Ark.
Reid, T. Roy	Agricultural Extension Service, Little Rock, Ark.
Rogers, E. J.	E. C. Atkins & Co., Memphis, Tenn.
Rosborough, T. W.	Caddo River Lumber Co., Rosboro, Ark.
Schilling, H. G.	Chicago, Ill.
Schuster, E. P.	Arkansas Democrat, Little Rock, Ark.
Schrenk, Herman von	Missouri Pacific Railway, Missouri Forestry Ass'n., St. Louis, Mo.
Shannon, C. E.	Seaboard Air Line Railway, Little Rock, Ark.

Sherman, E. A	U. S. Forest Service, Washington, D. C.
Siecke, E. O	Texas State Forestry Dept., College Station, Tex.
Smith, A. M	Little Rock, Ark.
Smith, B. F	Industrial Lumber Co., Elizabeth, La.
Sonderegger, V. H	Louisiana State Forester, New Orleans, La.
Spore, G. W	Anderson Tully Co., Memphis, Tenn.
Steck, W. R	Jonesboro, Ark.
Steele, George	Missouri Pacific Railway, Little Rock, Ark.
Stone, E. B	U. S. Forest Service, Hot Springs, Ark.
Stone, Florence H	Southern Pine Association, New Orleans, La.
Thrane, Victor	Chicago, Ill.
Tyler, W. D	Clinchfield Coal Corp., Dante, Va.
Vaughan, George	National Tax Commission, Little Rock, Ark.
West, W. F	Fort Smith Lumber Co., Plainview, Ark.
Watt, E. B	Crossett Lumber Co., Crossett, Ark.
Woods, John B	Long Bell Lumber Co., Kansas City, Mo.
Williams, C. M	Deep Bayou Lumber Co., Pine Bluff, Ark.
Williams, W. K	Crossett Lumber Co., Crossett, Ark.
Wilson, C. B	U. S. Forest Service, Hot Springs, Ark.
Wimberly, J. T	Cabot, Ark.
Wooten, J. E	Little Rock, Ark.
Wright, Morehead	Arkansas Honorary Forestry Commission, Little Rock, Ark.

PROCEEDINGS
OF THE
Eighth Southern Forestry Congress

Held at
RICHMOND, VIRGINIA
January 6, 7, 1926

A. AND M. PRESS
College Station, Texas

OFFICERS

of the

EIGHTH SOUTHERN FORESTRY CONGRESS

President——HORACE L. TILGHMAN,
President, Tilghman Lumber Co., Sellers, N. C.

Vice-President——DR. A. C. MILLAR,
Secretary, Arkansas Forestry Commission, Little Rock, Ark.

Secretary-Treasurer——W. K. WILLIAMS,
Crossett Lumber Co., Crossett, Ark.

Assistant Secretary——A. B. HASTINGS,
U. S. Forest Service, Washington, D. C.

Chairman, Executive Committee——W. D. TYLER,
Clinchfield Coal Corporation, Dante, Va.

Chairman, Publicity Committee——JAMES BOYD,
Editor, Lumber Trade Journal, New Orleans, La.

Executive Committee—The above officers, together with all former Presidents of the Congress, constitute the Executive Committee.

The Former Presidents Are:	*Elected*
COL. JOSEPH HYDE PRATT, Biltmore, N. C.	1916
HON. HENRY E. HARDTNER, Urania, La.	1920
MR. ROY L. HOGUE, Jackson, Miss.	1921
MR. W. D. TYLER, Dante, Va.	1922
MR. BONNELL H. STONE, Blairsville, Ga.	1923
MR. J. S. HOLMES, Raleigh, N. C.	1924

PREFACE

The Southern Forestry Congress was organized in Asheville, N. C., in July, 1916, at a meeting which had been called by Dr. Joseph Hyde Pratt, then State Geologist of North Carolina. Participating Associations in this Convention were: North Carolina Forestry Association, Association of Eastern Foresters, American Forestry Association, Society of American Foresters, North Carolina Pine Association, and Appalachian Park Association. This Congress resolved to perpetuate itself as the Southern Forestry Congress, but owing to the War the second meeting was not held until January, 1920. Since that time the meetings have been annual.

The proceedings of each Congress have been printed for distribution to delegates and others interested in Southern Forestry through contributions made by patrons, most of whom are Southern lumbermen. Most of these volumes are now out of print but an occasional one can be secured from one or other of the State Forestry Associations which purchased a portion of some of the editions for distribution to their members.

The present volume does not include all of the papers presented at the joint meeting. In order to keep publication costs within an advisable limit it was necessary to omit a number of excellent papers dealing with subjects not directly connected with forestry problems in the region represented by the Southern Forestry Congress. The Executive Committee regrets exceedingly that it was impossible to publish every paper presented at the Richmond meeting.

E. O. SIECKE, *Secretary-Treasurer.*

March 1, 1926.

CONTENTS

PAGE

ADDRESS OF WELCOME — 7
Governor Lee Trinkle of Virginia.

RESPONSE AND ADDRESS — 8
George D. Pratt, President, The American Forestry Association.

THE FIELD OF THE SOUTHERN FORESTRY CONGRESS — 14
H. L. Tilghman, President, Southern Forestry Congress.

FORESTRY IN THE DEVELOPMENT OF THE SOUTH — 19
Wm. L. Hall, Hot Springs, Arkansas.

FORESTRY AND THE LUMBER INDUSTRY — 22
E. F. Allison, Allison Lumber Company.

WHAT FORESTRY MEANS TO THE RAILROADS — 25
J. C. Williams, Manager, Development Service, Southern Railway System.

APPOINTMENT OF COMMITTEES — 31

NATIONAL FORESTS IN THE ECONOMIC LIFE OF THE SOUTH — 31
Col. Joseph Hyde Pratt, North Carolina.

NATIONAL FORESTS AND GAME RESOURCES — 34
A. B. Brooks, Chief Game Protector, West Virginia.

THE FEDERAL GOVERNMENT'S POLICY FOR SOUTHERN NATIONAL FORESTS — 38
Col. W. B. Greeley, Chief Forester, U. S. Forest Service.

ADDRESS — 44
George F. Authier, Journalist, Washington, D. C.

THE REGENERATION OF APPALACHIAN HARDWOODS — 49
E. H. Frothingham, Director, Appalachian Forest Experiment Sta.

DIAMETER LIMIT CUTTINGS IN SOUTHERN PINE — 55
R. D. Forbes, Director, Southern Forest Experiment Station.

REFORESTATION AND THE LUMBER INDUSTRY — 63
J. W. Watzek, Jr., Vice-President, Crossett Lumber Company.

FORESTRY AS PRACTICED IN EASTERN NATIONAL FORESTS — 69
R. M. Evans, U. S. Forest Service.

THE SPORTSMEN'S INTEREST IN THE NATIONAL FORESTS — 74
Col. H. L. Opie, Staunton, Virginia.

PRACTICAL REFLECTIONS ON FORESTRY — 78
W. H. Andrews, President, National Tie Manufacturers Assn.

STATE POLICY IN FORESTRY — 82
Wm. A. L. Bazeley, Conservation Commissioner, Massachusetts.

CONTENTS—Continued

PAGE

Fire Protection Standards — 86
Leonidas Coyle, State Fire Warden, and C. P. Wilber, State Forester, New Jersey.

Some Aspects of State Forestry in Virginia and the South — 90
Chapin Jones, State Forester, Virginia.

STATUS OF STATE FORESTRY IN THE SOUTH:

Alabama—*Page S. Bunker, State Forester* — 95

Arkansas—*Dr. A. C. Millar, Arkansas Forestry Commission* — 97

Florida—*W. L. Barnett, Florida Forestry Association* — 100

Louisiana—*W. R. Hine, State Forester* — 101

Maryland—*F. W. Besley, State Forester* — 104

Oklahoma—*G. R. Phillips, State Forester* — 108

North Carolina—*J. S. Holmes, State Forester* — 108

South Carolina—*H. H. Tryon, State Extension Service* — 111

Tennessee—*R. S. Maddox, State Forester* — 112

Texas—*E. O. Siecke, State Forester* — 114

West Virginia—*A. B. Brooks, Chief Game Protector* — 116

Report of Secretary-Treasurer — 118

Resolutions Adopted by Joint Meeting — 118

Report of Committee on Place of Meeting — 123

Report of Committee on Nominations — 124

Appendix I. *List of Patrons of the Eighth Southern Forestry Congress* — 125

Appendix II. *List of Registered Delegates Attending Joint Meeting* — 127

Proceedings

OF THE

EIGHTH SOUTHERN FORESTRY CONGRESS

IN JOINT MEETING WITH

THE AMERICAN FORESTRY ASSOCIATION

RICHMOND, VIRGINIA

JANUARY 6-7, 1926

The joint meeting of the American Forestry Association and the Southern Forestry Congress was convened in the Auditorium of the Jefferson Hotel, Richmond, Virginia, at 10:00 a. m., Wednesday, January 6, 1926. The meeting comprised four half-day sessions and the chairmen of these sessions were as follows:

WEDNESDAY FORENOON SESSION—
  George D. Pratt, President, The American Forestry Association.
WEDNESDAY AFTERNOON SESSION—
  William H. Hall, Hall Kellogg Company.
THURSDAY FORENOON SESSION—
  H. L. Tilghman, President, Southern Forestry Congress.
THURSDAY AFTERNOON SESSION—
  E. O. Siecke, State Forester of Texas.

ADDRESS OF WELCOME

Honorable Lee Trinckle, Governor of Virginia, welcomed the delegates with a brief address in which his interest in forestry was attested by his declaration that in his proposed budget for Virginia he has increased by fifty per cent the funds asked for forestry purposes. The Governor added that in his annual message he had devoted more space to forestry than to any other subject. "Expenditures for forest protection and regeneration are the part of wisdom." said the Governor. "As a boy in the mountains of Virginia, I watched forest fires miles in extent burning and destroying this valuable form of property. But the people of Virginia and the lumbermen of the State are awakening to the fact that a dollar spent in protecting our forests today means $10 returned tomorrow." At the conclusion of his address the Governor paid a warm tribute to the zealous efforts and noteworthy accomplishments of Chapin Jones, State Forester of Virginia.

THE NEW YEAR IN FORESTRY

GEORGE D. PRATT, *President, American Forestry Association*

President, American Forestry Association

This meeting, let us here resolve, ushers in a new year of renewed effort in behalf of American Forests. For us who are members of The American Forestry Association, it opens the door to a new half century of labor and lays upon our shoulders the definite responsibility of carrying forward to larger accomplishment the work so ably begun by our public spirited predecessors. It seems most appropriate to me that we should meet on this occasion here in the South, clasping hands, so to speak, with the Southern Forestry Congress and gathering inspiration from its youthful and vigorous career. Young though it is, this Congress has already well planted the seeds of progressive forestry throughout the South. Its record is indeed an inspiring one, and we take off our hats to the men and women whose unselfish and untiring efforts have created its splendid influence. I doubt if any other forestry organization has accomplished so much within its field in so short a time. Speaking for the members of my own Association, therefore, we appreciate this opportunity to meet with you, and I express the hope that one of the lasting results of this meeting will be combined effort, based upon common understanding, common objectives and an earnest spirit of friendly cooperation. That, I may add, is the bone and marrow of progressive forestry.

This meeting is both regional and national in scope. Its great objective is growing forests, not only throughout the Southland, but, throughout all other forest regions of our nation. If by our united efforts pledged here today we can hasten the advance of the forestry movement in the South, we will have accomplished much for the nation as a whole.

The year just closed has been one of more than ordinary conservation effort. It has brought us to a definite line of battle. On the one hand we are flaunted by an insidious attack upon our greatest conservation accomplishment. I refer to the National Forests of the West, and the well-laid plans of certain powerful stockmen to break up these great forests into grazing units and to give, by special legislation, a small group of individuals grazing privileges that would make forestry and water protection on these public forests a joke and a sham. You are familiar with the audacious proposals which these stockmen are urging the Senate Public Lands Committee, and I will not go into them except to say that in my judgment this attack is a call to arms for every friend of forestry throughout the country. If the stockmen are successful in their legislative siege in Washington this winter, twenty years of progress in public forestry will be undone. Our National Forests, let us remember with pride, represent the greatest conservation project in the World's history. If we are incompetent or remiss in our efforts to save them from the rapacious attack of a few politically powerful stockmen, we are incompetent to carry forward forestry in other lines.

The National Forests are public property set apart for forest production and watershed protection. They were not set aside for grazing. The public's first interest in them is forests and water, and any proposal from any group of individuals to divert their use or to alter their chief purpose must be fought as a fire in the forests. There must be no complacency, no giving ground to any legislation that will impair the freedom of the Secretary of Agriculture to manage these Forests, first and last, as forest growing properties.

The American Forestry Association has thrown its full strength into this controversy. It has sought by every fair means within its facilities to warn and inform the public whose property is at stake. It is calling upon every public spirited organization throughout the country to throw its influence in behalf of the People's forests—the only assured reserve we now have of a future forest supply. The issue is coming to a head this winter in Congress, but the time for action is now. The men on Capitol Hill who vote for you must know where you and your neighbors stand. Let your slogan be ACTION NOW.

The other great threat to progressive forestry, which the past year seems clearly to have defined, is the threat of false economy on the part of the Federal Government in dealing with our forest situation. We have boasted much of the Clarke-McNary Act, but the value of a law must be measured by the good it accomplishes. I do not criticize the Clarke-McNary Act as a law, but I am concerned at the failure to make it operative. True it does not prescribe for all of our forestry ills, but it is a prescription for some of them, and unless we can make it operative, progress in federal forestry must continue at a standstill. It is based on the principals that the Federal Government will, through cooperation, do its part in helping to reduce forest fires, promote reforestation and increase the area of publicly-owned forests in eastern states, if the state and local governments and private owners will, in turn, do their part.

Many of the States, taking new encouragement from the enactment of the Clarke-McNary Law, have attacked their forest fire problems anew and with a will. The Pacific Coast and the Southwest point this year to a sharp reduction in the number of man-caused fires. Land owners, men interested in wild life preservation and business have demanded that Michigan, Minnesota and Wisconsin stop the chronic pest of forest fires and adjust the intricate problem of forest taxation. Intelligent people throughout the South are making progress in reducing the amount of woods-burning as practiced by cattlemen. Massachuesetts with a record of 3,000 fires and 38,000 acres burned over in the past year is undertaking an interesting experiment to determine the value of public education and intensive patrol in the prevention of forest fires. New York State reports 319 fires during the past year, covering a trifle over 4,000 acres in the Adirondacks and Catskills, an improved record. Idaho has put into operation a slash disposal law.. New Jersey is making a study of fire protection standards. Georgia and Missouri have created Forestry Departments and put them to work. I mention these things—and there are many more that might be mentioned—because they are clear evidence of the renewed energies in the states, based upon the rightful assumption that Congress will not break faith with the states in the operation of the Clarke-McNary Act by refusing adequate appropriations for cooperative forest protection.

Although passed two years ago, we must now frankly admit that we have failed to get the Clarke-McNary prescription properly filled. It called for an appropriation for cooperative fire protection of not to exceed $2,500,000. Last year the sum actually appropriated under this item was $660,000. With the conviction that the amount did not meet the Federal Government's share of broad cooperative needs, effort was made last fall by some twenty national organizations, under the leadership of The American Forestry Association, to have the budget for the new year carry a fire protective item of $1,500,000, at least. Our efforts were unavailing, for the new budget grants not one penny of increase to permit the Federal Government to meet its larger obligations in saving our forests from fire. Such a course of action brings home the conviction that the Budget Bureau's policy of economy, as applied to forestry, is a policy of deferred expenditure in the Capitol City without regard to tremendous current losses in our outlying forests. Such a policy, I believe, is inconsistent with the President's recent statement that:

"All proposals for assuming new obligations ought to be postponed, unless they are reproductive capital investments, or are such as are absolutely necessary at this time."

Forest fire admits of no delay. Expenditures which stop it are reproductive capital investments in the highest sense. If we are to advance in our building of a National Forest policy, according to the plans of the Clarke-McNary Act, we must convert our legislative builders to the truth that stopping forest fire is a capital investment for both state and nation. Until the log of false economy is removed, there is no alternative left for the friends of forestry but to urge upon the Appropriations Committee of the House of Representatives that this item be increased,—or if the Committee fails to grasp the urgency of the case to carry the fight to the floor of Congress. Certainly the people of the United States cannot allow the business of tax reduction to be accomplished at the expense of its natural resources.

Another activity of paramount national importance, closely linked with the operation of the Clarke-McNary Act, is the work of acquiring with greater speed more National Forests in our eastern states. Many people who are profoundly interested in forestry know little of the severity of the forest situation as it relates to the eastern half of our country, and when it comes to our friend whom we call the "man in the street," for want of a better designation, he has no conception of how our great area of cut-over land continues to pyramid and remain idle, how forest fires continue to devastate, and how pitifully small an area is covered by actual reforestation. I am no advocate of the Federal Government undertaking more than its share as a forest owner, but I do believe most sincerely that our Government has a definite responsibility to the people as a whole to manage under the best forest practice possible a reasonable area of forest growing land in our eastern states. Its responsibility is threefold, first, the protection of our streams, second, assurance of a timber reserve in case of war or industrial urgency, and, third, to demonstrate progressive forest practice on the ground.

In recognition of this need, The American Forestry Association, seeking to make operative that section of the Clarke-McNary Act authorizing a broader program of federal forest acquisition in the east, sponsored a year ago a special bill to establish a ten-year fiscal program for the work. This measure, known as the McNary-Woodruff Bill, would authorize an appropriation of $3,000,000 a year for a five year period, and $5,000,000 a year for the succeding five years,—a total authorization of $40,000,000 to be expended during the next ten years. The appropriations were drawn on a scale which it was felt would make it possible for the Federal Government to acquire by the end of the ten year period three million additional acres in the White and Appalachian Mountains, some two and a half million acres in the Lake States, and a similar area in the pine and mountain regions of the South. Due to the crowded calendar last winter, the bill did not come to a vote. It has recently been reintroduced by Senator McNary in the Senate and Congressman Woodruff in the House. I cannot too energetically urge your personal support of the measures. It has been ordered by fifty or more strong organizations throughout the country, and if further united support is brought to bear upon it, I believe that it will be passed. Accomplishing legislation of this character is not done by inaction. Bills do not pass simply because no one is opposed to them. Let us put the brand of progress on Federal Forests in the east and be done with the uncertain and haphazard policy which now prevails.

Turning now to private endeavors in forestry, we may indulge in a more optimistic view. Here significant progress is being made. In all regions of the country, the necessity of timber growing as sound industrial practice is more and more occupying the attention of forest owners, large and small. In increasing numbers they are adopting some form of forest management looking to permanent utilization of their lands and protection of their growing timber from fire. Although I may be called to account by some of my friends from the Pacific Coast, or New England, I will venture the statement that the movement is proceeding most definitely and most widely throughout the great pine producing lands of the South. Whether this trend is due to the growing pressure for stumpage or to years of public education, it would be denying credit where credit is due not to mention the strong influence which has come from such pioneer efforts and demonstrations as those of Henry Hardner, A. K. Sessoms, the Great Southern Lumber Company, The Crossett Lumber Company and a number of other progressive owners in the South. Had these men attempted two decades ago what they are doing today, they would have been ranked as visionaries and impracticals. Today they are doers in forestry.

To the South, this growing change in the forest outlook and forest practice of timberland owners is of tremendous moment. It is laying the ground work for the great South to recapture the world's leadership in lumber production which until recently it held for more than twenty years. Excepting only cotton, forests have been the South's greatest producers of wealth for a quarter of a century and more. They have brought to the southern states some twenty thousand sawmills, representing an investment of half a billion dollars and employment to as many people. The sale of lumber, turpentine and other forest products has enriched the South during the last two decades by upwards of ten billion dollars. And a fact of national moment is that timber plenty in the South has meant timber plenty pretty much for the country as a whole.

It is unnecessary to dwell upon the rapid retreat of our southern forests and the equally rapid march of idle acres, claiming forest growing land like an army of "Red squatters." The task before the South and the nation is to evict these idle acres by the strong arm of public sentiment. What private individuals are doing, what the states and the federal government are doing in reforestation must have back of it, if their efforts are fully mature, public understanding and cooperation. Protection from fire, adjustment of taxations and the creations of conditions fair and just to the timber grower will come only through public education and public help.

In the talks and discussions which will follow, you will consider many of those important questions in detail. Their solution is not possible within this room. The remedies, as all know only too well, lie with the people. Our plans and our hopes will be unfulfilled unless we return to our homes and our work determined to redouble our efforts of popular education in forestry. The greatest bar to forest progress today, I believe, is popular ignorance of forest protection and reforestation. It is nowhere better illustrated then by the yearly record of fire burning throughout the South. Scientific research will not avail if the public, in ignorance, will not accept its results. Real progress demands a far greater campaign of public education if national interests represented by timber supply, home-building, industrial permanency, water and soil protection, wild life propagation and recreational development are to be adequately and permanently provided for.

We are trained to believe that all public accomplishment comes from united effort. Our opportunity is here. Never in the whole history of American forestry has there been a more opportune time for effective cooperation in promoting popular forestry. The public mind is in a receptive mood for authenic information on all subjects pertaining to forests.

The possibility of united effort in working closer together in our educational work was clearly demonstrated last year by the American Forest Week organization. Its activities reached into every state in the Union. I am glad that the committee has been made permanent, with Former Governor Lowden still at its head. It will function again this year during the week of April 18 to 23, and I urge a continuation of your splendid support, individually and through your different organizations. For a year-long educational campaign of somewhat the same character, The American Forestry Association is now seeking to raise a fund of $50,000 a year for three years. A part of the money has already been raised and we are hopeful of completing the budget early this year. Once the sum is completed a great forward step in public education in forestry through coordinated effort will be possible. But the raising of this money is no easy thing and I invite your individual cooperation now no less heartily than later.

As I close, I want to say that today we stand at a point in conservation which calls for something more than wringing our hands over mistakes of the past, dangers of the present and hardship of the future. The call is for determined effort, along all lines, with optimism born of knowledge gained in the past twenty years and nurtured by the highest patriotism. The goal is that the forests of America shall be reconstructed and maintained to enrich our own age and the lives of coming generations.

FIELD OF THE SOUTHERN FORESTRY CONGRESS

H. L. TILGHMAN, *President, Southern Forestry Congress*

It is a great pleasure to be here and to unite with the American Forestry Association in this conference for the good of our common forestry problems. We, the officials of the Southern Forestry Congress, wish to express our appreciation to Mr. Pratt, President of The American Forestry Association, and the Board of Directors for their acceptance of our invitation, thus making this meeting possible.

The two Associations have the same aims and ideals and are working along the same lines. The American Forestry Association with fifty odd years of service to its credit started at a time when only men and women with a vision of the future could feel any interest in the conservation movement, and, today it has every reason to be proud of its record and standing in our public life.

The Southern Forestry Congress was started in 1916 by a few thoughtful men who realized the situation in the South and knew that something must be done. They saw the South's need of forest products for its own future development and at the same time observed the wasted, cut over and fire swept land, millions of acres producing nothing for the owner and nothing taxable for the support of public institutions. Out of this realization of the need of the South grew the Southern Forestry Congress. These men who have given their time and thought to the solution of these forestry problems have made a distinct contribution to their country.

It is difficult to measure results in matters of this sort but at the time the Congress was organized in 1916 six southern states had enacted forestry legislation and were organized and at work. These were: Maryland, Virginia, West Virginia, Kentucky, North Carolina and Texas. In addition to these, we now have forestry laws and organizations functioning in Georgia, Oklahoma,, Missouri, Alabama, Tennessee and Louisiana. In Tennessee and Louisiana forestry laws had been passed previous to 1916 but at that time state funds were not available for the support of the work. Louisiana was one of the first southern states to recognize the importance of conserving the forests and today she is leader in this work. In July 1921 the Southern Forestry Congress held its annual meeting in Atlanta, Georgia, and there found a state with no organized forestry department. Today a forestry department is established in that state having been preceded by a forestry association which was a direct outgrowth of the meeting of the Congress. In January 1923 the Congress held its annual meeting in Montgomery, Alabama. The Governor of Alabama and other officials of the state took an interest in this meeting. Today Alabama can boast of some of the most progressive legislation which has been passed in the south and can point to a forestry department which is already aggressively organizing the state along forestry lines, and which promises much to the future welfare of the state. We feel that the influence of the Congress materially hastened the establishment of organized forestry work in Oklahoma. Missouri now has a forestry department headed by Mr. Frederick Dunlap, who has been one of our staunchest supporters and perhaps we aided him while he was helping us.

South Carolina, Florida, Mississippi and Arkansas are without any forestry legislation but we believe all of these states will pass laws creating forestry departments in the next meetings of their respective legislatures.

We all know in order to make progress in forest conservation it is necessary to have in each state an organized department supported by effective laws and sufficient funds.

As shown by the history of Congress state departments of forestry in the south have been created partly through the educational work of the Congress backed up and supported by the United States Forest Service under the able direction of Col. Greeley.

My experience in working very hard for an organized forestry department in South Carolina has thoroughly convinced me that we need to expend part of our energy and resources in educating members of the legislature. I find that generally they want to do what is right and best for the citizens whom they represent and once they are convinced of the wisdom and desirability of the legislation it is not difficult to secure the necessary laws.

Two years ago in South Carolina, talking with members of the legislature, we found few of them sensed the forestry problem and apparently we were up against a stone wall. One member of the legislature introduced a resolution to extend an invitation to Mr. Pinchot to address the assembly. This was defeated. Another member wanted to know who this man Pinchot was anyway.

We were convinced before we could secure any forestry legislation we would have to make these members of the legislature see the problem as it really was and realize the need for action.

After some consideration and having in mind the value of the wonderful magazine published by The American Forestry Association we decided to send it to every member of the Legislature for three months. This was done with the cooperation of Messrs. Butler and Allen. By special arrangement articles were carried in these issues dealing with the forestry problem in South Carolina.

In the following session of the legislature an invitation was extended to U. S. Senator Joseph Ransdell of Louisiana to address them in joint session. Senator Ransdell accepted and delivered a splendid address which was listened to with deep interest. Today nearly all of the legislators say something should be done and we believe forestry laws will be passed in this next session of the legislature.

When the people of the South are brought to a realization of the enormous economic loss from forest fires, that with intelligent care they can probably grow one half of the timber which can be grown in the United States, and, that the forest products are needed more and more in the South for its own development, then, will we begin aggressively to attack the problem. The South has been slow in developing but the past few years have brought marvelous changes and I believe we are only beginning this period of development and that the next few years will bring us undreamed of progress. This development will be diversified and to complete the circle we will have real need for all the forest products we can grow and conserve on the neglected acres of idle land.

A short time ago Florida, having a production much larger than she could use. was sending lumber to other states, today she is importing large quantities of lumber in order to supply the demands within her borders. Almost over night she has changed from an exporting state to an importing state.. We all know the situation in Florida is without parallel in our history, but who can say this will not happen to the other states. It will happen more slowly, of course. Florida does nothing for its forests, has no state organization of any kind, and it is the usual practice to burn the woods.

The forest fires of this year have wrought untold damages to the forests of the nation. In my state we could hardly breathe or see in the country and town for the smoke of the burning woods during most of the past summer. In view of these losses I think, if possible, we should speed up our whole campaign and try to educate the people so as to stop the continuance of these conditions.

Of course, the job of educating the people along forestry lines is a tremendous one and we have very properly made this one of our major activities but I wish to lay even more stress upon its importance at this time. Now, I believe in having well organized state forestry departments backed with laws and funds necessary for them to properly function but at the same time I realize it is a tremendous task to try to handle the situation in any state with the present prevailing public opinion. The enforcement of any law is largely dependent upon the attitude of the people toward that law. We should aim to have every person in the state a fire warden and of a mind which would not permit a crop of young trees to burn any more than they would a hay crop in the field or a house by the road. This is a matter of education and enlightment which means work and more work for all of us.

In order to bring this point more forcibly to your attention I am going to take an illustration from South Carolina.

A few years ago in South Carolina we discovered that we had a large number of men and women who could not read or write. This situation was brought to the attention of the legislature and money was appropriated for the support of what are called: "Adult Illiterate Schools." This splendid work is still going on and our percentage of illiterates has been very much reduced. After this work was started it was realized we would soon have a second crop of Adult Illiterates unless we could have all the boys and girls of school age attend school, so to head off this situation a compulsory school attendance law was passed, now every boy and girl of school age must attend school. Under this plan we have hopes of stamping out illiteracy in South Carolina. A large part of the population of this country are adult illiterates in forestry problems and it is our job to reduce the number. While we are doing this we must head off a second crop by having forestry conservation taught in the public schools. I believe this to be of paramount importance. The children of today are the citizens of tomorrow. The importance, methods, and aims of conservation should be taught in the elementary schools if our National resuorces are to be conserved. During the past year we used our influence with the State Boards of Education of three states to have forestry taught in the schools and I am glad to say that they recognized the need and value and adopted this study for the schools.

Educate all, both old and young, so they will know as you and I know the need of keeping the fires out of the woods then we can sit back and view a task very nearly completed.

I know men who are carrying a heavy burden paying life insurance premiums in order to provide for their dependents and at the same time owning large areas of land on which they allow fires to destroy the growth. Protected, these same areas would assure their families perhaps more income than from the insurance and leave the owners the premium to use while living.

I am optimistic about the forestry situation in the South, for I am thoroughly convinced that we are having a general awakening and I feel this interest will spread further and further until in the next few years we will show wonderful gains in every way. The day of cheap idle lands in the South is about to pass. The burden of carrying these vast areas of non-productive land has been a heavy drag on our states of the South and now we see them being gradually but surely lifted and we know better things are in store for us.

Reforestation and conserving of the forests of the south is a national problem and is so regarded. Much has been done but the real work is ahead and needs vigorous action.

I am glad that in this great work we have the support and cooperation of The American Forestry Association, and I feel sure that our united efforts will speed up the progress of all work for forest conservation.

FORESTRY IN THE DEVELOPMENT OF THE SOUTH

WILLIAM L. HALL, *Hall, Kellogg and Company*

So rich is the subject in materials for consideration that in a few moments in a crowded program one can only hope to single out and comment briefly on a few important factors in the situation.

At the start it might be well for us to fix anew in our minds the fact already well known that the timberlands of the south are very extensive. They cover large portions of sixteen states, including on the north the States of Maryland, West Virginia, Kentucky and Missouri and on the west Oklahoma and Texas,—one-third of the States of our Union. According to our best estimates this great region contains some 220 million acres of forest lands—nearly one-half of the whole area of forest lands of the United States.

This great forest estate is not changing in acreage rapidly at present. In places forest lands are being cleared. In other places abandoned farms are reverting slowly to forest. Since 1900 it is probable that the southern forest has increased in acreage. There are no present indications of rapid change during the next 50 years. It is doubtful whether the area will vary by as much as 25% during that time.

So we have a vast and rather stable area of forest interspersed through a region rich in other natural sources, teeming with industries and in the surge of present development on a vast scale. Under such conditions the potentialities of 220 million acres of reasonable fertile timberlands must be of great industrial importance.

In the second place let us consider what the production of such an area is likely to amount to. It is not in good condition at present. It has been unwisely handled and greatly damaged by fire. Its present productiveness has been greatly impaired, but, it has by no means been destroyed. What the region is producing now by growth no one knows. Much less can we estimate its productive capacity fifty years from now. Future productiveness depends upon many factors all of which are variable. There are variations in soil, variations in character and present conditions of forest. There will be great variation in the treatment to be given this property from this time on.

In spite of these variations or possibly because of them we can best assume that the sum total of influence is going to operate in the direction of an increasing volume of timber growth and a continuing large production on the part of timber industries. Perhaps the curve of production will drop in the immediate future. If so we may expect after a few years at the low mark to see it begin again to rise in a movement that is likely to continue through many years.

With a reasonable good growing stock of timber and conditions of management, let us say, on par with present standards of farming the south would grow as much timber as the entire nation requires for its timber industries.

But the question will arise, is any movement of this kind imminent and when is it likely to start? The correct answer seems to be that it started fully ten years ago, and that already we are feeling its effects. In fact they are marked. Today a very substantial percentage of southern pine lumber is coming from second growth forests. That crop came by chance. It is nature's gift to us in spite of heedlessness, neglect and blind disregard of possibilities. The percentage of lumber coming from this class of timber increases every year. Before another 25 year period passes it will furnish the entire output of southern lumber. The current has set very strongly towards increasing production from this class of timber. In actual fact it is not over emphasis to say that during the past year, second growth forests in the south have moved to the center of the stage.

It is the utilization, further development and extension of second growth forests that today commands attention of lumbermen, foresters, and many public agencies. This is the key to the problem of making the 200 million acres of southern timberlands an asset of tremendous industrial and national importance. It is not enough to say that second growth forests in the south now command attention. It is more accurate to say that a movement to utilize, develop and extend these forests is rapidly taking shape.

What are the factors that are today shaping and giving direction to this movement? There are a number but I will mention only three. First among them is the solid and forward-looking lumber company. The company that has been financially successful and retired its indebtedness, that has not dissipated its holdings, that either by chance or forethought has maintained a considerable stock of growing timber, that has put a good deal of its earnings back into the development of its property, that has not too long a list of stockholders out of intimate touch with the problems and opportunities. It is such companies—only a few of them as yet—who have gained the vision of renewed forests, permanent operations, steadily growing communities and expanding dependent industries. Yes, more than that, the vision of sons succeeding fathers in the management and upbuilding of great timber industries without the necessity of hopping here, there, and yonder to find a body of timber to work on. The year 1925 saw announcement from a number of important groups of decisions to act in this direction. Many more have the subject under serious consideration.

Second among the influences playing into this movement I mention the solid and forward-looking forester. The foresters who have had considerable experience in dealing with the reforestation problem in general and at least know how to study that problem for a particular locality or property; these are the men whose work is bearing fruit in the south today. These men, and I am glad to say there are a number of them, can sit down with the manager or owner of a lumber operation and talk convincingly of the possibilities and advantages of permanent operation, the steps necessary to be taken to prepare the property in question for continous production, and stimulate a desire to act in that direction.

It is not one man who must be convinced. It is every official of the company. They cannot always be seen together. There are sometimes months of waiting. It takes unending patience sometimes and sometimes it takes quick, snappy action. Yes indeed the forester is an important factor. He is the starting motor in the big machine. But this is his first part. He has much more to do. It is his province to lay out the plans, and get them going. He must train the entire force to new ideals and new methods. This is the fine part of the work, as all foresters of such experience will agree. It is picking the fruit of our labors and the labors of many others before us. It is at last getting results on the ground that every body can see. So important is the private forester that I have learned of no case where any considerable progress has been made without him.

Third among important influences towards reforestation in the south I place the public cooperating agencies, including the Forest Service, State Forestry Departments, Tax Bureaus and organizations such as the American Forestry Association and Southern Forestry Congress. Perhaps this should have been mentioned first for it is very important. These agencies have done much already and in the future can do much more. They can greatly aid to make conditions favorable for progress in reforestation. They must continue to educate the public and give them constant help in getting the public to sense its responsibilities in the great problem of reforestation. The cooperation of every agency is enormously important to overcome the inertia that today is the greatest obstacle to advancement.

What the Federal Government and the States may do in acquiring lands and producing forests is important so far as it goes. It does not at present promise to go far enough to become a very big factor in the final solution of the Southern Reforestation Problem.

Let me close by coming back to the question that seems to be implied in my subject. We should think of it in terms of National well-being and prosperity. My answer to the question is that in the next fifty years as in the last fifty the forests of the South will play a very important part in our National well-being and prosperity. General application of forestry will be the impetus by which this will be accomplished.

FORESTRY AND THE LUMBER INDUSTRY

E. F. ALLISON, *Allison Lumber Co.*

It becomes apparent that Forestry and the Lumber Industry must form an ever closer alliance for they are becoming more and more dependent one upon the other.

We lumbermen, of course, are looking to the conservation of our present forest and the growing of timber as the means of perpetuating our great industry, the products of which enter so intimately into the daily lives of all people and in so many homely and commonplace ways that they often escape attention, but these products are an irreplaceable part of the roadbed of our great railways; the luxuries and necessities of life are stored and shipped in containers of wood or wood products; wood is in our homes, in our automobiles, in the toys of our children, in the heels of our flappers' shoes and our best corn is aged in it.

In the early days of lumber manufacturing, the stands of timber of the best quality covered vast areas of land but the demand for lumber was not great and the uses to which it was then put required such strength and durability that it was economically possible for the lumbermen to cut only the choicest trees, also to utilize only a small part of the trees that were felled. This created a great waste in the very cream of the forest but had the effect of conserving the young timber and most especially, the quickgrowing varieties. This forced conservation served to guarantee the succeeding generation an adequate supply of lumber at reasonable prices even though the consumption of lumber was steadily increasing and wasteful processes of logging and manufacturing were employed. However, the forest areas were still vast and many manufacturers were using stumpage cost rather than replacement values in determining cost of lumber manufacture.

An ever-increasing and broadening demand for lumber brought more and more species of trees into commercial use until finally, practically speaking, all trees have a commercial value. Up to that point, the lumber consumers were the conservationists and were responsible for the slender unbroken thread of conservation running through this entire period.

The manufacturer at last began to experience difficulty in replacing logs with mature trees, and then begins his conversion to conservation. His first step was in taking better care of his logs and their products, a closer utilization of the log through improvement of manufacturing processes; a better care of the lumber, but he was still laboring under the belief that more trees were waiting his call, only they were a few miles farther off and when at last he goes out to secure these trees, he finds that some distant neighbor manufacturers have bought part of them and two or three gasoline portables have worked up some of the corners and anyhow there are not so many trees there as he had been led to hope. He buys what is left of them and when he looks over this inadequate supply, shuts his eyes, signs the check, he resolves to eleminate every possible waste not only in the processes of harvesting the timber and the conversion into lumber but in the elimination of dangers to his standing timber. In protecting his standing merchantable timber, the young trees are given their opportunity and even the seedling is given its chance for life. Thus, through purely economic forces, the course of the manufacturer is directed into conservation, not only of the merchantable timber on his lands but as incidental there-to, the seedlings and the very sources of propagation. So long as the manufacturer posesses merchantable timber of considerable bodies, it is sound business for him to give it protection and as a consequence of this protection, the seedlings and bushes, the hope for posterity's timber supply, are given protection. But we near the time in the Southland when merchantable stands are becoming scarce, smaller and more scattered. The great timber regions of the East and Mid-West have already reached that stage, and the consequent cost of protection from fires, become greater. Also as the timber in the hands of the manufacturer dwindles the tax and the investment in the logged-over areas becomes more and more burdensome on the manufacturing operations so that with an ever-dwindling supply of merchantable timber, these burdens must be distributed and become payable when revenues from the timber crop permit. Our lands are the logical place for growing a crop of timber as nature will reproduce if given a chance. We have the excess moisture so necessary to timber growth.

From these facts we must now arrive at the conclusion that the manufacturer is a conservationist. He has equipped his plant with modern machinery. He realized the necessity. We have now to convert the carpenter, the architect and the consumer. At this stage of our progress they are responsible for a large percent of our waste. They do not yet realize that short pieces of lumber can be used instead of cutting up long pieces to get the same lengths that the manufacturer is forced to allow to go into the refuse burner.

No better disposition of our swamp lands could be made than to grow more timber. In certain areas near centers of population, drainage for the sake of the health of community and for agriculture purposes is preferable but the cost of this work and the adaptability of the overflowed areas for raising timber a thing as necessary as other crops, makes it more practical to use them for the purpose of growing timber at least for the present. Of course, as the population increases, need for more lands for agricultural purposes will develop but let these needs be taken care of as they occur and in the meantime, let these lands be producing good crops of timber. In this way, we can keep both reclamation and timber growing on a very sound and practical basis, best serving the present generations and best conserving for the future generations, for timber returns to the land a fair wage, in the form of prevention of erosion of soil and actual addition to the soil, for its keep.

The Manufacturer with his present stand of timber and his logged-over land, with the proper aid from the states in the form of deferment of taxes and sufficient guarantees of reasonable taxes at harvest time, is best situated to grow timber at the lowest possible cost.

WHAT FORESTRY MEANS TO THE RAILROADS

J. C. WILLIAMS, *Manager*
Development Service, Southern Railway System

So manifold are the uses of wood and its derivatives that every man, woman and child, and every industry in the United States, is interested in the conservation and perpetuation of American forests.

American railroads are interested in the continued growing of trees as directly as are the lumber industry and all of the wood-using industries. A very large proportion of their revenues are derived from carrying forest products and manufactured goods which use forest products as raw materials. They are among the largest users of forest products and their annual purchases of ties, bridge timbers, lumber for car and building construction and many other purposes absorb twenty-seven per cent of the total annual lumber cut of the United States.

During the year 1923, the latest for which complete figures are available, the class 1 roads of the United States carried 227,570,867 tons of forest products, on which they earned $419,807,000.00. In that year products of forests made up 9.5 percent of the total tonnage of the class 1 roads and contributed 9.1 percent of their total freight revenues. These figures cover only forest products in their primary forms and do not include the tonnage and revenue contributed by the long list of manufacturer commodities in which wood is used alone or in combination with other materials.

It is manifestly to the interest of the railroads that revenues from forest products and their derivatives shall be preserved. It is no less to their interest that the prices of the ties, timber and lumber which they buy shall not be forced to exorbitant levels by a constantly diminishing supply.

If railroad revenues are to be maintained; if the great variety of industries using wood and chemical derivatives of wood are to be prosperous, and if lumber consumers are to buy at moderate prices, there is no time to be lost in bringing about the adoption of policies of forest and woodland management under which the annual production of wood will at least equal the annual cut and destruction by fires, insects and other natural causes.

United States Forest Service statistics show that the present annual drain on the forests of the country is more than four times the annual growth. There are about 725 billion cubic feet of standing timber in the United States. The annual drain is about 25 billion cubic feet and the annual growth is only 6 billion cubic feet. In other words, the annual drain exceeds the annual growth by about 19 billion cubic feet. It is a simple matter of mathematics to show that, if there should be no change in the ratio of annual growth to annual drain, there would not be a foot of timber left standing in the United States in 1964, and such wood working as might survive would have to rely entirely upon imported logs and lumber.

We shall not have a treeless country in 1964 or at any other time in the future. The ever-increasing scarcity and advancing prices of all kinds of forest products are already restricting consumption and forcing a constantly increasing use of substitutes. Values of forest products have already reached a level at which the growing of trees is one of the most profitable uses to which certain types of land can be put. This has long been known by students of forestry but it has only been within recent years that it has been learned by some private land owners. Others have not learned it. National, State and other public forests have done much to prove that trees are profitable crops. State plantings in Pennsylvania through a series of years have demonstrated this so clearly that private individuals are now planting more than the state. New York, awakening to a realization that the primeval forests of the Adirondacks are rapidly disappearing, has gone into state forestry on an extensive scale, the 1926 program calling for planting 37,000,000 trees. At Petersham, Massachusetts, there is a notable demonstration that tree growing is profitable, even on relatively small areas, and in that nothern climate where tree growth is slower than in the South. In the South, longer growing seasons make tree growth more rapid and the profits of forestry correspondingly greater than in the North.

It is clearly to the public interest that there shall be neither a decrease in wood consumption nor any substantial further increase in the prices of wood products. To bring about stabilization of consumption and prices at or near the present levels will require the cutting down of the present enormous losses by fire and the very prompt increase of the annual growth to the level of the annual cut.

Losses from Forest Fires

Estimates of the direct and indirect losses from forest fires in the United States run as high as $500,000,000.00 annually. Fire losses can never be entirely done away with, but they may be substantially reduced by effective patrols and by ever-lastingly preaching the personal interest of every individual in guarding against the starting of forest fires. Fire prevention is particularly difficult in those localities, such as the coastal plains of the South, where it has long been the practice to burn the woods from year to year under the mistaken idea that it tends to improve pasturage. In such localities little can be done in the way of enforcement of laws against starting forest fires until a public opinion has been built up that will make the man who sets fire to the woods as unpopular as the man who would set fire to his neighbor's house.

The railroads, and especially their roadway forces, have an important part to play in forest fire prevention. Looked at only from the narrow viewpoint of claim prevention, self interest impells them to adopt every reasonable means to prevent the starting of fires by locomotives and to see to it that, in burning condemned ties, grass and trash, fires do not spread off the right-of-way.

As has been stated, the annual drain on the timber supply of the United States is about 19 billion cubic feet in excess of the annual growth. This measures the amount by which annual growth must be increased if even the present rate of use is to be provided for. To take care of larger demand to meet the needs of increased population will require a larger increase in growth. The importance of immediate action will be apparent when it is realized that, if all of the required acreage should be reforested today, a large proportion of the new crop, including the slower-growing varieties, would not reach saw size until practically all of the virgin timber stand of the United States had been cut.

Great as has been the stimulation of public interest in the perpetuation of the wood supply of the United States, the immediate increase of annual growth to the amount of annual drain cannot be hoped for, and reforestation bids fair to be a slow process until revised tax laws shall make the growing of trees more profitable. The outlook, then, for some years to come, would seem to be a continuation of the upward trend of prices of all forest products, automatically restricting consumption and encouraging the growing of trees.

The needs of the future are being taken care of in some measure by national, state and other public forests, but these will be utterly inadequate unless supplemented by returning to the growing of trees millions of acres of cut-over lands under private ownership, on which, under proper policies of fire prevention and of timberland taxation, trees may be grown more profitably than other crops. Intelligent taxation is nearly, or quite, as important as fire protection. It is apparent that lands from which a crop is harvested once in every 25 to 40, or even 60 years, cannot stand the same system of taxation that is applied to lands from which crops are harvested annually. Eleven of the states have recognized this and have substituted a yield tax, paid when the timber is cut, for all taxes on growing timber. This is manifestly the correct policy and should apply, not only to the large holdings of the lumber companies, but also to farm woodlands. There are on most farms, areas that the farmer can more profitably devote to tree growing than to other uses, especially if encouraged to do so by proper adjustment of his taxes. While the individual farm woodlot cannot go far toward supplying the timber needs of the country, when it is multiplied by millions it becomes an important factor, and, under proper encouragement, can be made to supply an increasing proportion of the forest product demand.

Reforestation, if provided for while the virgin forest is being cut, is not expensive. Trees will come back from seeds or sprouts on any land on which they have grown if given half a chance. All that is necessary, therefore, to perpetuate a forest is to so cut the mature trees as to do a minimum of damage to the young growth that is coming on, to leave an adequate number of seed trees of the desirable varieties and to cut out all trees of the undesirable kinds. But fire must be kept out. Even lands that have been cut clean will reforest themselves in time if fires are prevented. Seeds will be blown in by the winds and carried in by birds and animals, but such reforestation is slow and there is no means of controlling the varieties. On such lands, especially where they have been burned over annually after logging and the young growth has all been killed, the only effective method of reforestation for quick results is by planting.

Southern Railway Demonstration Forest

The Southern Railway Company is operating a forestry project, the primary purpose of which is to demonstrate that the growing of pine trees may be made a profitable business in the South Atlantic and Gulf Coastal plains and that lands may be used for this purpose that cannot be farmed profitably under present economic conditions.

It is a tradition that when the railroad from Charleston, S. C., to Augusta, Ga., which is now part of Southern Railway System, was built more than ninety years ago, large acreages of woodlands were acquired to assure a fuel supply for the wood-burning locomotives then in use. When wood was superseded by coal, sales of these lands were made from time to time, but the Company still owns tracts of various sizes, aggregating about 18,000 acres, for which no market has been found, for the reason that much of it is too wet for farming. But it is ideal for growing pine trees, especially the water-loving slash pine. Last year a system of forest management was inaugurated on a tract of about 10,000 acres near Pregnall, S. C., and smaller near-by tracts.

All of these lands had been cut, but, fortunately for the future of the forest, lumber was not so valuable then as now and a large number of trees were left which have served to keep the lands thoroughly reseeded. The original stand was loblolly and long leaf pine and several varieties of hardwoods. As a result of having an abundance of seed, notwithstanding the frequent burning of the land, most of it is covered by a fine stand of young trees of varying ages, but the second growth trees are almost all long leaf, which is more fire resistant than loblolly. On some areas where the fires have been more frequent or intense than on others not even the long leaf has survived. These areas are being replanted. All plantings are being made with the quicker-growing and more valuable slash pine of which there was none in the original stand and of which there are no seed trees.

A cruise of this tract showed enough mature trees to make immediate lumber operations possible, and in June, 1925, a saw mill was installed by a contractor working under the supervision of the Company's forester. All of the long leaf pines of nine inches or more in diameter at breast height are being turpentined by a conservative system which will not materially reduce the rate of timber growth. This operation has already conclusively demonstrated that lands of this character can be made to yield satisfactory profits from the growing of trees. Based on current prices for lumber being paid by Southern Railway Company, this forest has produced a profit after absorbing all expenses.

Fire is the most difficult problem to be dealt with on this tract and we have shown that forest fire damage may be kept within narrow limits. Prior to the inauguration of our forestry work, this tract was burned over in whole or in part every year. Owing to the unusually dry weather of the last summer and fall, forest fires were particularly severe in that part of South Carolina. The lands embraced in this project were constantly patrolled and, although several fires were started or spread into the tract from adjoining lands, they were quickly extinguished and not more than fifty acres were burned over. As an additional means of preventing the burning of these lands, fire breaks are now being plowed and it is believed that, with an efficient patrol, destructive fires on this tract may be prevented.

These lands, topographically and with respect to the character of growth on them, are representative of large areas throughout the South Atlantic and Gulf Coastal plains, and the main purpose of the Southern Railway operation is to demonstrate to the owners of these lands that it pays them in dollars and cents to keep out fires and give the trees a fair chance even though they may not go to the expense of planting.

There is need for additional information as to the rates of growth of long leaf and slash pine and the effects of thinning upon the growth, although data is now being assembled at several points in the South. As a contribution to this information, plots of long leaf pine in this forest have been turned over to Mr. H. H. Tryon, State Forester of South Carolina, who has inaugurated thinning experiments and the accumulation of growth data. On these experimental plots each tree is numbered and a yearly record of growth will be kept for each tree and will be compared with the growth of similar trees in a check plot where no thinning will be done. Similar growth and thinning experiments will be carried out in the slash pine plantings.

Another purpose of the operation is to test out various methods of turpentining with a view to demonstrating that conservative turpentining may be done profitably in the long leaf and slash pine forests of the South without retarding the production of saw timber. It will require some years to carry on this operation to the point where valuable data as to growth and the effects of thinning and turpentining on growth will be available. But it is hoped that, even before these experimental data are available, this project will have an educational value that will contribute substantially to the conservation and reproduction of the forests of the South. This will have the result of preserving to that section one of its great economic advantages, that of being able to grow crops of trees much more quickly than can be done in the colder North. Inspired by the results obtained in our demonstration forest a large lumber concern in that locality is already planning a similar system of forest management on its large holdings. The general adoption of this system will bring into profitable use vast areas of land that are more valuable for timber growing, under present conditions, than for any other use, and will, at the same time, assure the important woodworking industries of the South perpetual sources of raw materials.

APPOINTMENT OF COMMITTEES

Chairman George D. Pratt announced the appointment of the following joint Committee on Resolutions to represent both the American Forestry Association and the Southern Forestry Congress.

Joint Committee on Resolutions

Col. Joseph Hyde Pratt, Chairman	North Carolina
Mr. Wm. L. Hall	Arkansas
Mr. D. A. Crocker	New York
Mr. Francis Cuttle	California
Mr. J. G. Peters	District of Columbia
Mr. E. O. Siecke	Texas
Mr. Philip W. Ayres	New Hampshire

President Tilghman of the Southern Forestry Congress announced the appointment of the following Committees:

Committee on Nominations

Col. Joseph Hyde Pratt, Chairman	North Carolina
Hon. Henry E. Hardtner	Louisiana
Mr. H. L. Kayton	Georgia
Mr. W. D. Tyler	Virginia
Mr. E. O. Siecke	Texas

Committee on Place of Meeting

Mr. W. D. Tyler, Chairman	Virginia
Mr. W. L. E. Barnett	Florida
Mr. E. F. Allison	Alabama
Mr. R. D. Forbes	Louisiana
Dr. A. C. Millar	Arkansas

NATIONAL FOREST IN THE ECONOMIC LIFE OF THE SOUTH

JOSEPH HYDE PRATT

The National Forests and their administration by the Forest Service under the able leadership of such men as Gifford Pinchot, Henry Graves and W. B. Greeley have, I believe, been one of the underlying and main forces, and influences, that have brought about the general interest now shown in timber growing, management, and protection, by states, lumber companies and individuals. The headway that forestry is now making throughout the country can be traced, in the South at least, to the influence exerted by National Forests.

Until the agitation was started for the preservation of the forests of the Southern Appalachians in 1898 there was little or no thought given to the need of the preservation or protection of our forests. The main idea at that time was not a National Forest, because they were unknown in this country, and the forest areas on the public lands were known as Forest Reserves, and it was not until 1905 that these were taken over and administered as National Forests.

In 1898 a group of Southern men, following the suggestion of Gifford Pinchot and Henry Graves, met in Asheville, N. C., to discuss the question of how to induce the Federal Government to take over certain of the forest lands of the Southern Appalachians, so as to insure their perpetuation and use for recreational purposes by the people of the country. The name first suggested for these areas was "National Parks," but as the campaign went on, it was changed to "National Forests." This agitation for the preservation of the forests through Federal acquisition of the land began to attract the attention of the people of the country to the wonderful beauty of the forested areas of the Southern Appalachians, but it was not, however until the southern forces joined with the people of New England in a similar request and agitation for the establishment of Federal forest reservations in the White Mountains that the campaign made decided headway. It is very probably that this campaign which was carried on continuously by both the Southerners and the New Englanders, was one of the main causes that led, in 1905, to the Forest Reserves being declared National Forests and administered as such; or it may have been, that the changing of the name from "Forests Reserves" to "National Forests" was one of the causes that led to the change for "National Parks" in name to "National Forests" for the White Mountain and Southern Appalachian areas.

It was not, however, until 1911 with the passage of the Weeks' law that the Federal Government began to acquire land in the White Mountains and Southern Appalachians for National Forests. Since that time the Federal Government has acquired 87,304 acres in Alabama; 59,337 in Arkansas; 159,878 in Georgia; 354,289 in North Carolina;19,522 in South Carolina; 267,938 in Tennessee; 502,016 in Virginia; and 219,124 in West Virginia, making a total of 1,701,767 acres in all.

This agitation for National Forests in the South is also largely responsible for the interest created in forestry that led to the establishment of the forestry departments in North Carolina and Virginia.

This one and three fourths million acres of National forests represent at the present time the only real definite source of our future timber supply of that section. The administration, however, of these areas had and is having an influence upon the states and lumber companies to acquire and hold forest lands and administer them in the interest of a future timber supply. I haven't the time to go into the reasons and causes why this is not taken up more generally by lumber companies, but will only refer to one cause, which is perhaps the chief cause, namely: taxation of timber lands. Several of the states have acquired forested areas, but such acquisition has not extended to anything like as large an extent as in the Northern States. In several states it is being advocated that it would be policy for the state to acquire at least as much land for state forests as the Federal Government has acquired in that state for National forests. National forests have also had a certain influence in creating an interest by cities and towns in acquiring land for municipal or town forests. At the present time there are at least 250 towns which own forests comprising an area of more than 5000 acres. Thus far, however, only a few of these are in the south. Asheville, N. C., has the distinction of owning the largest municipal forest in the south. In most cases the prime purpose of the municipal forest has been the protection and conservation of municipal water supplies.

As stated in the original Act passed by Congress authorizing the creation of National forests, they were for the purpose of protecting the water sheds on the headwaters of navigable streams and their tributaries, in order to protect the navigability of our rivers. This protection has extended, not only to navigation, but has been a wonderful influence in conserving the water and protecting the water supply of our water powers. There is no question but what the National Forests have had a decided economic influence in water power development in the Southern states, and the fact that the Federal Government own these large areas of National forests, were protecting the same from fire, and were continuing the acquisition of additional areas, has also had a decided influence on the extension of water power development in the South.

National forests have also been of real economic value to several of our cities and towns by the fact that these towns were able to lease certain areas in the National forests for their water supply.

Another economic effect of National forests in the South has been their relation to the tourist industry. By the construction of roads and trails these forests have been available to the tourists who are visiting the Southern Appalachians by the hundreds of thousands. At the present time the Forest Service is maintaining 777 miles of roads and 3,242 miles of trails, which are open to the public without any fee. The Forest Service has expended thus far $1,746,304 in the construction and maintenance of roads and trails. In addition to this $349,252 have been spent for the same purpose from cooperative funds. That the people do appreciate the forests as places to visit and for recreational purposes is evidenced by the 11,000,000 and over people, who visited the National Forests last year. Of these over a million visited the Southern Appalachian and Eastern forests. It is hard to estimate the real economic value of the forests to the tourist trade. It is not only in the number of visitors, but in the influence the preservation of National forests is having on the visitors and people of the South in requesting similar protection for the preservation of the other forests of the South. As game preserves and game refugees the forests also have an economic value to the tourist industry.

The forests are also laboratories where the trees and shrubs can be studied. In the preservation of the forests, types and species of trees and shrubs, peculiar to the section of the country in which the forest is located, are also preserved and are really National History Museums.

NATIONAL FORESTS AND THEIR GAME RESOURCES

A. B. BROOKS, *Chief Game Protector, West Virginia*

The National Forests in the United States and Alaska, numbering 152 and containing 158 million acres, comprise areas in every life zone from the tropical to the alpine. They embrace altitudes from the sea level to 15 thousand feet, and have every conceivable exposure, cover, kind of food, and other conditions, forming the habitats of the principal species of game mammals and birds, fishes, and other wild life native to the North American Continent. A census of big game on the National Forests places the number of antelope at 5,000; black and brown bears, 44,000; grizzly bears, 6,000; deer, 600,000; elk, 53,000; moose, 5,000; mountain goats, 17,000; and sheep, 12,000.

Our conception of the National Forests, therefore, need not be based wholly upon the commercial timber aspects—the number of board feet or the quantities of forest products with certain monetary values. My subject takes us away from forestry but not away from the forest.

It would be interesting to know each person's individual conception of a forest. Doubtless to some a forest is merely a piece of ground growing trees; to others it is a hunting ground; to others a watershed protecting the streams. Likewise, to some the forest is a field for collecting botanical or zoological specimens; to some a retreat for rest and recreation; a health resort; or a place to satisfy the aesthetic. The complete forest is a complicated composite of plant and animal life—a living, breathing organism, pliable and adaptable to the needs and varying interpretations of all

Many persons do not know the forest nor understand its meaning. Neither those who regard it as a collection of standing timber which can be measured and sawed into lumber, nor those who look upon it as a place overgrown with thickets of thorns and populated with dangerous and repulsive reptiles and insects, nor yet those who claim to admire it from a distance or from a passing automobile and speak of it in terms of flippant sentiment, have really known it. To know the forest it is requisite that one should live in it for a time, eat and sleep within it, drink water from its springs, gather fruit from its vines, climb its mountains and follow its streams in quest of game or recreation. The timid deer cropping vegetation on the lonely lake shore, the mountain sheep upon the crag, the chattering squirrel, the grouse upon his mossy log, the musical thrush, the tiny wood folk beneath the leaf mould, are as much a part of the forest as the trees themselves. Without them a forest is no more a forest than an empty house is a home. All these forms blending in harmonious hue and tone produce Nature's great sylvan symphony and together constitute the spirit as well as the substance of the forest.

Manhood, in his publication entitled "Laws of the Forest," published in 1598, defines the forest as "a certain territory of woody grounds, fruitful pastures, privileged for wild beasts and the fowls of the forest, to rest and abide in, in the safe protection of the king, for his princely delight and pleasure." This ancient conception of a forest and its uses, which has somewhat swallowed up by modern economic considerations, may well be revived. At any rate the definition is in keeping with the purposes of my remarks. In our consideration of this subject it is proper that we discuss, briefly, the interrelations of animal life and the forest, and the part which the National Forest will play in our future supply of game.

The forest trees and the lesser plants among them have formed a partnership, as it were, with the beasts, the birds, and the smaller creatures. The squirrel plants the nut which grows into the tree that feeds his offspring; the shew, burrowing beneath the leaves, devours the larva of the nut weevil, thus preserving the nut and maintaining life in the shrew; the wild turkey, the grouse, and the water fowl swallow the seeds of tree and shrub and scatter them in favorable soil. The birds say to the forest, "Give us your protecting shelter and we will rid you of the insects that prey upon you.' No plant community could remain intact without its associated active protectors. The ecological balance must forever be maintained. Neither party to the partnership could survive without the other.

We may or may not be approaching the close of the age of mammals. I cannot say. But we have all seen the rise of the hunter-array, the perfecting of the deadly firearm, the reduction of game covers, with the consequent total extinction of certain species of game, the practical disappearance of others, and the waning of nearly all. The rate of destruction, on the whole, during the last forty years need not be accelerated to insure the fulfillment of the prophesies of the most radical alarmist.

It is our disposition, however, to look hopefully forward because we look knowingly backward. The unforgivable mistakes of the past have brought their lesson. It is inconceivable to me that a single species of game now abundant would be allowed to suffer extinction—except from possible natural causes beyond our control—during the next forty years, or the next. Had we the roosting grounds of the passenger pigeon today we would make of them a sanctuary and not a slaughter pen. America has a race of the most intelligent, far-seeing, pure-blooded sportsmen the world has ever known. International treaties, Federal legislation, and state enactments, ever strengthening, form the background of security. The broad-minded policies of conservation promulgated by Government chiefs in cooperation with state officials, give purpose and stimulus to effective work.

Amidst perpetual change it is eminently satisfying to find the elements of permanence. Most of our forests have not been permanent. No feature has been more constantly and disastrously altered. There was the necessary disturbance for agriculture, the necessary removal in lumbering. But there was the unnecessary destruction attending the latter, and there was the ever-present fire. So that one year we could stand within coolness of towering trees and the next year within a heap of ashes. But all forests have not been subjected to exploitation and change.

To me a protected forest, under permanent ownership, is something more than a thing of beauty and has an inexpressible appeal. It is like a rainbow of promise insuring to us wood, constant streams, scenic beauty, game and fish, recreation and health. Such are the National Forests.

The plans of the Federal Forest Service have not neglected to include the safeguarding and propagation of game. Included in the system of National forests there are five Federal refuges, containing a total of a million acres. These refuges are well distributed, one being at the Grand Canyon, one in Oklahoma, one in Wyoming, one in Tennessee and Georgia, and one in North Carolina. In addition there are 130 state refuges inside the National Forests, containing a total of 16 million acres. Such refuges are established under agreement between the Department of Agriculture and State Departments and are given protection as authorized by state statutes. The two refuges with which I am most familiar are the Otter Creek Refuge, within the Monongahela National Forest, and the Brocks Gap Refuge, within the Shenandoah National Forest, the first wholly within West Virginia and the latter, recently established, in West Virginia and Virginia. Under the terms of the contract they are established for a period of ten years, but it is understood that renewal will follow, making them permanent. In addition to protection given such refuges by officers of our state department certain Federal officers upon the forests are commissioned as game protectors, being thus authorized to make arrests for violations of the game laws. We look upon such refuges as not only permanent but ideally located, with surrounding hunting grounds, with unusual facilities for guarding, and with the best of fire protection—a thing in itself of first importance to the perpetuation of game and fish. The artificial restocking of these refuges can be done with safety and assurance, and this is being done in many places. As an example, the Game and Fish Commission of West Virginia has recently placed a number of white-tail deer in the Otter Creek Refuge, before referred to. These animals, introduced from distant states, will mingle with the resident stock, building up a healthy, virile race. In addition to the deer, the black bear, wild turkey, ruffed grouse, gray squirrel, and the common fur-bearers are resident upon these refuges and some are already showing marked increase in numbers. We expect these refuges to be highly successful, even though they are located in badly devastated sections.

We can truthfully say, that the National Forests, stretching from coast to coast, and interlocked with the system of state forests and game refuges, will constitute, in future years, the great permanent reservoirs of game and other useful wild life, and will be the controlling influence in perpetuating our most valuable species.

THE FEDERAL GOVERNMENT'S POLICY FOR SOUTHERN NATIONAL FORESTS

W. B. GREELEY, *Chief, U. S. Forest Service*

Looking back over the past thirty years, the historian will point out three distinct steps in the creation of National Forests. The first was the reservation of the timber-producing portions of the public domain, a striking phase of the awakening to the need for conservation that will always be identified with the administration of President Roosevelt. The second step was marked by the passage of the Weeks Act in 1911, which launched a policy of forest purchases in the eastern States primarily for protecting the headwaters of navigable streams. The third step followed in 1924 when the Clarke-McNary Act extended the field of forest purchases to include denuded, and other lands whose acquisition is desirable for the growing of timber.

In the first two stages of National Forest development, the United States was, in a sense, pioneering in forest conservation. It was blazing the trail. It was not attempting to draw complete plans for a national program of forestry that would extend to all of the timber growing lands in the country. It was dealing rather with the most obvious and urgent things that had to be done at once.

The third step in the extension of National Forests, on the other hand, was one part of a comprehensive program which looked ahead to the growing of timber on all of the 469 odd million acres of American soil that appears primarily to this economic service. This program, in a word, sought to define the place for National Forests in a general plan wherein industrial forestry and farm forestry were assigned the greater part in the common undertaking.

The Committee which framed the Clarke-McNary Act set up as its goal "to increase as rapidly as possible the rate at which timber is produced on the lands suited to this form of use." The main lines of attack in attaining this goal were to be:

> "(1) To extend public forest ownership in areas where special public interests or responsibilities are involved, like the protection of navigable rivers; and also where the natural difficulties, costs and hazards attending reforestation render it impractical or remote as a private undertaking."
>
> "(2) To remove the risks and handicaps from private timber growing as far as practicable, in order to give the greatest possible incentive to commercial reforestation."

I would like to place the federal policy of National Forests before you in this light, not as something by itself but rather as part of an all round plan of timber production in the South. The sixteen States comprising the Southern Forestry Congress contain about 227 million acres of forest land, or 37 per cent of their total area. It is noteworthy that this region contains almost one-half of all the forest land in the entire United States. When to this vast acreage is added variety and value of forest products grown in the South, the rapid rate of growth in response to her favorable climate, and the proximity of these vast resources by rail and water to the largest markets of the country, it is, I believe, obvious that forest culture is bound to become one of the great and permanent industries of this region. The steady trend of economic forces is making forest culture commercially profitable. The United States is gradually but inevitably shifting from the virgin forest to the timber crop for its source of wood. And as the depletion of our virgin forests continues and the timber crop in consequence commands a higher and higher value, the southern States will, by reason of the natural advantages which I have cited, in my judgement become the greatest forest producing region of the entire Union.

And I believe further that, just as far as possible, this development should come about under State leadership and through private and industrial activity. I believe in vigorous action by the national government in matters where the federated effort of all people is necessary to do something that will not otherwise be done, or to protect common interests that will otherwise be jeopardized. But I do not believe that, particularly in the realm of economic development where forestry belongs, the federal government should assume activities which can, with the right kind of leadership and cooperation, be equally or more effectively carried by local communities or private citizens.

I believe that the goal set up for the Clarke-McNary Act, of increasing as rapidly as possible the rate at which timber is produced on the lands suited to this form of use, will be accomplished mainly in the southern States through industrial forestry and farm forestry. There are already striking gains in this direction. The Forest Service recently listed 18 large timber and land owning companies in the southern pine region who have adopted some definite scheme of timber growing on their holdings. There are many other land owners in the South, in the hardwood and pine regions alike, who are working out plans of forest land management along the same lines. In many sections cutover lands are no longer regarded as something to be junked and gotten rid of by the most expeditious process, but as a potential asset whose earning power is worth careful development. Certainly no policy of federal land ownership should be spread on the map that will in any-wise hold back or slow up the application of private capital and business brains to the industry of growing timber.

Let us rather adhere to the simple priniciple upon which the Clarke-McNary Law was written, of extending public forest ownership where special responsibilities must be met or where natural difficulties or hazards place timber growing beyond the reach of private effort; and its corollary, to lessen the risks and handicaps of industrial forestry so that commercial timber growing may attain the greatest possible momentum. To this principle we might add the desirability of establishing National Forests on rather limited areas in regions where they will render an important educational service in demonstrating the new order of forest land management and stimulating the reforestation of the privately owned lands around them. State and municipal forests will accomplish exactly the same purpose; and wherever their establishment is practicable the federal gevernment should leave this field to them.

This principle does give a definite place in the forest picture of the South to federal ownership; although in relation to the vast areas of forest land in this region its place will be a small one. Under the Weeks Act seventeen forest purchase units have been established by the National Forest Reservation Commission in the South, on the headwaters of a number of her most important rivers. In these units, the government has acquired to date a little over 1,934,000 acres. In lands acquired from all sources, including the public domain, the National Forests of the

South comprise approximately 3,163,000 acres. Within this total are 156,000 acres forming portions of eight Military Reservations in the South, which have been made National Forests under a wise provision of the Clarke-McNary Act which establishes the principle, that any and all lands retained by the Federal Government for whatever purpose should be protected and utilized as fully as practicable for the production of timber.

The extension of National Forests in the south, along the principles already established, should go on. Approximately 43 per cent of the purchase units thus far selected for the protection of important navigable streams has been acquired. These National Forests should be completed; and additional purchase units should be established in a few localities where the protection of the watersheds of navigable streams, and particularly inter-state streams, requires action by the national government, with the growing of timber of course a purpose scarcely secondary in importance. The mountains of eastern Kentucky, the headwaters of the Current and St. Francis Rivers in Missouri, and the Ozark section of Oklahoma are regions where this further application of the policy set forth in the Weeks law is probably needed.

The federal government should also move aggressively under the Clarke-McNary Act in acquiring additional National Forests in the South where they will be of the greatest aid in reclaiming lands now denuded and in promoting local reforestation throngh their educational, or demonstration, value. This applies particularly to the southern pine belt with its 30 odd million acres of seriously denuded land whose restoration to productive forests will necessarily be slow and expensive and will not in many cases be assumed by private owners. But this program of federal purchases should be correlated with the forest policy and development of the United States concerned in order that it may not replace but will rather supplement and aid local effort. I have in mind a few National Forest units of from 50,000 to 300,000 acres, located in such areas as the Sabine watershed in Texas and Louisiana, the Okamulgee Hills in Alabama, and the Biloxi pineries in Mississippi.

The general program which I have outlined in carrying out the purposes of the Weeks Act and the Clarke-McNary Act would result in the federal government buying from five to six million acres more forest land in the Southern States. What I have said should not be taken as belittling the importance of this phase of southern forestry. It is a unnecessary and urgent application of a national policy, formulated through years of study and experience in dealing with practical situations; it is the share of constructive forest land management in the Southern States which the nation should assume; and the federal government should address itself to discharging this responsibility much more aggressively than it has done in recent years. It has been my desire simply to throw the picture on the screen with a proper perspective. Out of the 227 million acres of forest land in the Southern States, it is not expected that the national gevernment will assume responsibility of ownership for more than four or five per cent. For the remaining vast acreage we must look to State Forests, municipal forests, and mainly to industrial and farm forestry, aided under the cooperative principle written into the Clarke-McNary Law, for removing the risks and handicaps from private timber growing.

Once the fire hazard to southern forests can be reduced to an insurable risk and moderate taxation of growing timber crops is guaranteed, I am satisfied that the future of southern forests is assured. To bring these conditions about so that the industrial forestry may be given free play in the south is the great cooperative undertaking in which the interests of the States, Federal Government, the timber land owners, and the general public should all be enlisted. And it is in this field as well that immediate progress is most urgent.

Only eight of the sixteen southern states now have forest protective systems; although it is encouraging to record that forest protection is about to be organized in four additional States of the South. Less than 22 per cent of the forest land in this region is now receiving some degree of protection; while on over three-fourths of it protection is entirely lacking. An average of 2½ cents per acre yearly, or a total of about $5,000,000 would probably give all of the forest lands of the South adequate protection from fire; but the present expenditures of the States, the counties and private owners, and the federal government combined are only about one-tenth of this amount. With the fundamental factor of safety from fire still so inadequately provided by public agencies, it is indeed encouraging that commercial forestry has already made such strides in the south. And by the same token I believe it a safe prediction that just so fast as the public gives the forest owner in this region reasonable security from fire and unwarranted tax burdens, industrial timber growing will extend.

The Southern States and the federal government are just entering an enormous field for cooperative achievement, in providing reasonable security for the forest owner. On the part of the federal government we need much larger resources to give full effect to the cooperative principle of the Clarke-McNary act. On the part of the States, there is need for a vigorous development of State forest policies, including the protection of forest lands with adequate financial backing, the growing and distributing of forest planting material, and a campaign of education in timber growing by farmers and other land owners. The aim of this campaign should be nothing less than to get the people of the South to think, speak, and act in terms of timber crops.

It is probable that the main course of our national forestry policy for a good many years to come has been chartered by the Clarke-McNary Act. It is built squarely on the principle of cooperation. It anticipates a constant outward spread of the forestry idea, reaching the industrial practice and land sense of the American people, and growing—not as a federal activity but as a matter of every-day business and usage of the soil. The South is the most promising field in the United States for making that policy completely successful. As it is carried out, there will be a definite place for a limited number of National Forests, at the critical points or key areas where this form of ownership is necessary to put the job over. The States and municipalities should share with the national government in providing ownership for the kinds of forest land that need it. But for every acre of publicly owned forest land there will be 20 or 25 acres in farm forestry and industrial forestry, in whose encouragement lies the greatest opportunity for the South to forge ahead rapidly in permanent timber production on a large scale.

I doubt if any group of people at any time have had before them so great an opportunity or so alluring a vision of creating an enduring basis of economic prosperity and social strength for a great and fruitful region, as that, which we have before us today in picturing the future of southern forestry. We have put our hands to the plough, and we are going to finish the furrow.

ADDRESS

GEORGE F. AUTHEIR, *Journalist*

I would be less than frank if I did not feel complemented in having been invited to be present on the occasion of the meeting of the American Forestry Association and the Southern Forestry Congress.

In admitting this gratification, I am sure the exponents of forestry will permit me to go further and express to our Richmond hosts the genuine thrill I experience in being, for the first time in my life, within the historic precincts of the capitol city of the Old Dominion.

Ever since the development of memory has made it possible for me to look both forward and backward, the charm of this city, its historic appeal, its splendid setting, has had a peculiar facination for me which I am gratifying for the first time tonight. Although I have lived within the vicinity of Richmond for several years and have planned to visit it often, something hitherto has always happened to thwart my hopes of arriving.

It is possible that the desire to visit Richmond which has always been strong upon me is an inherited instinct, for one of the earliest recollections of my boyhood concerns the assembling of several uncles about my father's hearthstone, where I heard them confess to a similar longing entertained by them about the period ranging from '61 to '65. As in my own case, always, just as they were about to crash the gates, something has invariably happened to enduce them to change their minds. And even if they did not carry away with them souvenirs of the proverbial Southern hospitality, some of them carried other souvenirs which registered the unerring accuracy of the markmanship of the Virginians of those days.

It is fitting that Richmond should be the setting for the meeting of the American Forestry Association and the Southern Forestry Congress. No state within the Union has been so prilific in its contribution of service to the nation as Virginia and in that credit its capital city shares. Nor are there any organizations so founded upon the ideal of service as the forestry and the conservation groups of this country.

Our entire history, epic as it is, has been a struggle with no less a difficulty than the conquest of a continent. What we enjoy today is but the fruition of infinite struggles and sacrifices, running all the way from Jamestown to Belleau Wood. We of the present are but the executors of the past and upon us rests the responsibility of expressing our appreciation of what we enjoy by passing our inheritance, unimpaired, to the generations to come.

It is this ideal of service which has characterized and motivated the forestry and conservation movements. The ever insistent temptation is to exploit the present, and let the future take care of itself. Forestry would develop the present so the future may not be poorer. Both of them are twins born out of the ideal of service—a service suggested by gratitude for the past and obligations to the future. With them walk the correlated duty of construction and development.

As to the contest impending in Congress between the stockmen of the west and the Forestry Service of the United States Government, I am running in neutral. I am much in the state of mind of the man who was careless about his eternal salvation because, as he expressed it, he had friends in both places. As a newspaperman, sitting on the sidelines of the investigations which were being conducted last summer, I was able to recognize the good points in both sides of the controversy. But as to the spirit and attitude of the doctrines of forestry and conservation there can be but one judgement and that is one of hearty approval and encouragement. If errors have been committed in the administration of this great department, there is a willingness and a desire to rectify. If there are compromises that should be made, I am certain they will be brought about. If there are revolutionary changes justified, I am confident they will be recognized and attempted.

But I am equally confident that whatever is done will always recognize the importance, the value and the abiding worth of the principles of conservation set in motion during the lifetime of Theodore Roosevelt and that no group of men will ever be permitted to impoverish tomorrow by exploiting today.

It is not my purpose to discuss the values of this controversy. I could not do it from a partisan view and from the viewpoint of the forest service no man is better qualified to explain its position than Col. W. B. Greeley, Chief Forester of the United States. I accompanied the Senatorial Investigating Committee of last summer on its western pilgrimage. Col. Greeley was present at all these meetings, including an almost nightly banquet in which the Forest Service was assailed and its representatives referred to as "bureaucrats." Throughout this experience, Col. Greeley conducted himself under trying circumstances with a poise and self respect that challenged the admiration of all. He never lost his temper, he never allowed himself to be baited, he was never jarred into a hasty or ill-considered word. Always he was master of himself and listened and participated with an air of a man sincerely interested in doing what he could for the western cattlemen and sheep business, so far as possible without sacrificing the basic principles of the Forest Service and the philosophy of conservation.

Discussion of forestry and conservation, however, from one who is inexpert, must necessarily be academic, and reflection moves me to justify the thrill which has come to me tonight in being here and which I referred to in the beginning.

Forests are but trees grouped, and beneath them must be a fertile soil and favorable conditions. Thoughts of trees naturally suggest thoughts of men and the soil of Virginia has been exceptionally fruitful in producing both. And these men of Virginia especially recall the giants of the forest, with their heads towering into the skies, their bodies rugged and strong, and their roots deeply inbedded in the soil. And as no state has born a more meaningful part in the building of our nation, so no state has contributed more generously in its quota of men whose names have found their way into the world's recital of great deeds accomplished.

It would be presumptuous of me, a son of the North, to attempt to tell you Virginians why you should be proud of your state. But it is not unfitting that I should confess some of my own reasons for revering the Old Dominion.

Here is the very cradle of the nation. The settlement at Jamestown antedates those of any other section and it was here that sturdy John Smith enunciated the doctrine of a working world, that he who will not work may not eat.

Virginia's contribution to the building of the new world has not been recognized at its true value chiefly because its men were men of action. In New England, where the climate and other causes developed a more dour mentality, men were prone to look upon duty performed with satisfaction and to write books about it. In Virginia the tendency was to perform the day's work as a matter of fact and to accomplish it with the gay and careless philosophy of noblesse oblige.

But Jamestown cannot be erased from the map any more than can the fact that you have a roadstead there in which all the navies of the world may lie at rest. The time is not far distant, when an awakened intelligence on the part of the American public will see the unwisdom of attempting to route the nation's traffic through the narrow neck of the bottle at New York and will seek to divert it by way of the central route. That will mean that a traffic greater than that which now pours into New York, eventually will traverse Virginia and the settlement grouped along Hampton Roads will become one of the greatest entrepots of the world.

But the achievements of the future, for Virginia, will ever be hallowed and illumed by the light of a sacred past. With such a past, material accomplishment must always be colored with the traditions which shed their radiance upon your history.

The beginnings at Jamestown but presaged the days to come. When the rumblings of discontent were heard; when the American colonies were girding themselves to assert the rights of man, it was a Virginian who reduced the spirit of the times to a phrase and made the purpose of America vocal.

For centuries past, privilege and caste had levied tribute upon mankind. The protesting voices of the countless Grachii of the centuries were concentrated in the inspired utterance of Patrick Henry when he expressed the modern alternative of "give me liberty or give me death," and flung his proud defiance into the faces of the oppressors of mankind for all time.

This was Virginia's initial contribution to that stirring period. When the country went to war, the nation turned instinctively to Virginia for a commander-in-chief for its armies and found George Washington ready. It would seem that a state which had furnished Washington had completed its quota. But even God exacts a surtax and the eternal law demands that those who have, shall continue to give in even greater and still greater abundance. Virginia supplemented Washington by giving the nation Jefferson, whose inspired eloquence dictated the Declaration of Independence, the greatest document which human liberty has ever produced. But two presidents were not enough and they were followed by Madison and Monroe. Such brilliant gifts to a nation's progress had never before been equalled and have not yet been approached.

The list was still unfinished and John Marshall takes his place as the first great Chief Justice of the nation, vitalizing the Constitution—making it through his wise interpretations the memorable document and fundamental law of the greatest nation in the world's history that it is today.

But even this does not exhaust the roll. While Virginia had furnished the commander-in-chief of the army, it was from the banks of the Rappahannock that John Paul Jones came to carve one of the world's most brilliant naval careers and to found the splendid traditions of the American navy. These names by no means completes the list which my time is to short to conclude.

The time came when the union of the states appeared to be severed and an inscrutable providence decreed that the annealing process must be completed in the supreme sacrifice. Virginia differed in that argument from the states of the North, but she bore herself with a courage and vigor and probity and deep devotion to the right, as she saw it, that has won the unstinted admiration not only of the nation as a whole, but of the world as well. Men may continue to differ as to the justification for that conflict, but Providence chooses her own methods and works in mysterious ways her wonders to perform.

Virginia honors the memory of her great captain. It is an admiration which the North shares. So splendidly has Providence justified her methods, that today the North vies with the South in its regard for the man who led the armies of the Southern states and divides its affection for Abraham Lincoln with its admiration for Robert E. Lee.

As the years go by, more and more, the world learns to recognize the genius, the capacity, and the nobility of character of General Lee. Only a short time ago, from the Press Gallery of the House of Representatives, I saw the venerable figure of Major Charles M. Stedman of North Carolina arise in his place on the floor to pay tribute to the memory of General Lee. At its conclusion, General Isaac Sherwood of Ohio arose on the Republican side, crossed the aisle, and clasping the hand of Major Stedman congratulated him and endorsed the tribute he had uttered. The House came up standing and cheered the tableau so presented. Since then General Sherwood has answered the last roll call. As he had done many a time before upon the field of battle, he sleeps tonight beneath the stars, a white and silent shaft of marble doing sentinel duty above his grave. Major Stedman remains the last surviving spokesman of that Titanic period to serve in the House of Representatives, the last figure from a time that was prolific in the production of heroes.

When the World War came, still another Virginian was on guard in the White House. Civilization was bled almost white and was in despair when this later son of Virginia, in words of eloquence which burned themselves unto the pages of history, expressed the aspirations of a world grown weary of its travail. He summoned the nation to arms and from

Jamestown to the Golden Gate they responded with the world moving cry,"We are coming, Father Woodrow, some twenty millions strong."

Men will continue to debate the causes of that war; they will appraise its participants, but history will write high at the top of the scroll of its men of fame the name of Woodrow Wilson of Virginia.

It is fortunate and fitting that the places sanctified by historic traditon should be found in various sections. Massaschuetts has her Bunker Hill; Pennsylvania he Independence Hall and her Valley Forge.

But to describe the places of historic interest in Virginia would be to recite the litany of the nation. The feet of American pilgrims are constantly turning toward Mount Vernon and Monticello. From Jamestown to Yorktown one runs the gamut of the making of America.

Other States have their sacred places, but only in Virginia, may it be said, almost without exaggeration, that every hill is a temple, and every valley a shrine.

THE REGENERATION OF APPALACHIAN HARDWOOD

E. H. FROTHINGHAM, *Director*
Appalachian Forest Experiment Station

Forest regeneration is the central fact in timber growing. It makes insistent demands upon fire protection, which is nine-tenths the protection of regeneration; upon the method of cutting, which is the preliminary to regeneration; and upon the early treatment of the young stand, which is the means of controlling the regeneration and starting it toward the goal of highest financial returns. As a field for scientific research, there is no subject in the domain of forestry which presents so many or so difficult problems for investigation. The course of forest management of any tract of timber is, in fact, punctuated and set off by the recurrence of the critical regenerative periods.

Regeneration may be said to begin with the production of the flowers and end with the germination of the seed; or to begin and end with the establishment of the thrifty sprout. The forester, however, must extend these limits. His purpose is not only to obtain but also to control regeneration, in both kind and amount. He must therefore anticipate seed and sprout production when he marks the timber for cutting, and he must follow the reproduction through the period of competition and until the dominance of a selected stand is assured. How to get and protect an ample supply of the desired kinds of regeneration is the question which determines most of the important activities in timber raising.

One of the oustanding features of the Southern Appalachian hardwood forests is their ability to reproduce themselves under hard usage. They are hard to kill. If the quantity of regeneration were the only or the chief requirement for successful timber growing, the problem would be solved with very little effort. The woods may be recklessly cut; fire after fire may burn through them; and still there will be some kind of forest growth coming in—poorer and poorer in quality after each successive fire, but still usually ample to restock the area with some sort of tree growth. There are, of course, spots and patches which finally run down to a low, compact cover of laurel, rhododendron, or scrub oaks, and there are many thousands of acres where a luxuriant forestry canopy hides a worthless timber stand. What the hardwood forests are suffering from is not quantity but quality of regeneration. The agents chiefly responsible for this deterioation are fire and resultant decay.

In a sapling stand of hardwood reproduction observed in Carter County, Tennessee, samples cut showed that the little trees were already heavily infected with heart rot. Yet outwardly the stand was dense and thrifty. The stems of the saplings carried fire scars which had largely healed over, and it was undoubtedly through these that the decay entered. In fire swept, cut-over hardwood areas of the Southern Appalachians there must be many acres of similar hardwood regeneration, thrifty enough to the eye but containing an increasing volume of decay which is nullifying the producing value of the stand. Such stands are among the forester's hardest problems.

Fortunately, fires do not burn everywhere every year. The young stands which are wrecked from the start are perhaps exceptional. Another form of deterioration, however, is prevalent even in sound and thrifty regeneration. This consists in the disproportionate representation of species which do not now and probably never will have a high intrinsic value. Such conditions are likely to be found in stands which have been culled, from time to time, of their best species, thus reducing the seed supply of the desirable kinds. The gaps left by these cullings become more or less filled by the crowns of the other trees of the forest, thus shutting off light from the reproduction. It happens that some of the most desirable trees, such as yellow poplar, basswood, red oak, white pine, cherry and locust, need much light for good growth and a moderate supply for bare existence. On the other hand, some of the least desirable, like beech, black gum, sourwood, rhododendron, and laurel, are able to thrive with considerably less light. The competition under a partial overhead shade is thus likely to result in the mastery of the better by the poorer species, so that when the reproduction is uncovered by the removal of the remaining timber stand it represents at best a mediocre and unpromising basis for a future yield. Even under this more modern railroad lumbering, which has taken a very much larger proportion of material than was possible in the earlier cuttings, there is often left enough of the crown cover, represented in very defective trees and particularly trees of poor species, to handicap seriously the establishment of desirable reproduction and thereby reduce the percentage of profit.

A third deteriorative influence upon reproduction is the prolific sprout producing capacity of most of the Southern Appalachian hardwoods. All the hardwood species will produce sprouts after cutting or fire, and two or three are noted for the quantities of suckers which come up from the roots.

Under favorable conditions and for suitable species, sprout reproduction may be definitely sought as an object of silvicultural cuttings. Coppice forestry on short rotations is widely practiced in Europe, and in our country chestnut has responded splendidly to the rough approximation of such management that was practiced in southern New England. In the Southern Appalachians, sprout reproduction is certain to play an important part in forest management. But it must be recognized that seed reproduction is, after all, superior in the vigor and persistence of the trees it produces. There are only two species—chestnut and basswood—which produce sprouts that are comparable in quality with seed reproduction. Of these, the chestnut is doomed by the blight and its wide spreading, rapid growing, and persistent sprout clusters will be only a handicap to the regeneration of the forest wherever chestnut is cut. Basswood is too sparsely scattered to be of much importance.

In general, therefore, sprouts are to be considered a handicap to the best reproduction. Some of the least desirable species tend to monoplize freshly cut-over or burned-over areas with sprout growth. Among them are shrubs and shrub-like trees, as well as tree species of larger size. On account of its abundance and wide distribution chestnut seems destined to be one of the most troublesome, since several generations of sprout clumps may come up and be killed before the blight finally puts an end to its sprout producing capacity. Sourwood, an abundant and widely distributed species within its geographical range, produces rapidly growing sprouts in large clumps. As a timber tree it has little promise of value because of its small size. Silverbell is another small and relatively inferior species which reproduces abundantly by means of sprouts. Laurel and rhododendron, which produce heavy clumps of sprouts when cut or burned back, are extremely aggressive competitors with tree reproduction. Dogwood, red maple, and black gum contribute their share to the sprout reproduction, and sassafras, through its root suckers.

The nature lover may have the consolation of knownig that, come what may to the forests of the Southern Appalachians, the species which contribute most to the brilliant beauty of these woods in spring—silverbell, dogwood, sourwood, rhododendron, and laurel—are among the best fitted to survive. To the forester, however, the aggressiveness of these species, their abundance, rapid early growth, heavy foliage, and the ability of several of them to grow under dense shade, are matters of serious concern. His efforts must be aimed to give every assistance to the reproduction of the better species, particularly that which originates from seed. This means warfare against what are, in effect, "weed species;" but it should be noted that the campaign lasts only until the preferred reproduction has reached a place in the sun. After that, the smaller and shade tolerant species may be left to grow, and some of them, such as dogwood, may be counted up for later yields of valuable wood products.

There is little doubt that the earlier successive cullings of the hardwood forest have robbed it of a part of its best seed supply. Black walnut and black cherry, and in many places yellow poplar and white pine, are much less abundant in the second growth than they doubtless would have been if these cullings had not picked out the seed bearing trees of these species, leaving a not very much opened up crown cover of the less desired kinds. The knowledge of this deterioative process which has taken place in the past should be an object lesson for future practice. From now on, wherever cuttings are made every effort ought to be taken to see that a seed supply of worthwhile timber trees—the best kinds available on the area—is provided. If clear-cutting is practiced, enough seed bearing trees of these species to insure a well-distributed reproduction should be left. For light seeded species like yellow popular, one tree to every two or three acres will insure at least a light seeding of the area and afford a means of restoring poplar to it. For heavy seed trees like the oaks and hickories, more trees must be left, perhaps three or four to the acre, and they should be distributed to take advantage of slopes down which the acorns or nuts will roll.

Under the crowns of most forests, especially those which have been previously opened up by culling, there is present an advance growth, in which the shade enduring species are likely to be more abundant than the light needing. This advance growth, together with the sprouts which will spring up from the stumps when the larger timber is felled, will prejudice the seed reproduction which starts later on as a result of leaving seed trees. When cutting is followed by fire the advance growth itself will sprout from the bases of burned stems. It is this monopolizing growth, previously described, from which the forester is called upon to rescue the seedling reproduction of the preferred species. The means of doing this are the so-called "release cuttings," which are bound to become one of the most important elements in Southern Appalachian forest practice.

The cost of release cuttings represents, in the Southern Appalachians, the cost of planting in regions less favorably situated for natural regeneration; but release cuttings can undoubtedly be conducted at less expense. Experiments begun three years ago by the Appalachian Forest Experiment Station are already showing satisfactory results in the salvage of a young reproduction of yellow poplar from death by shading. On the untreated sample plots which were left as a check, the poplar seedlings are rapidly being exterminated by a dense overhead shade of sumac, silverbell, and chestnut.

The provision of a seed supply of preferred species by means of seed trees will, it is believed, make planting or artificial sowing unnecessary in the hardwood forests. Particularly severe fires, burning in late spring or summer may, however, so thoroughly kill the stand that planting or sowing will be the only means of reforestation. Hardwood planting in the Southern Appalachians has been little tried, as yet, and with only a few species, notably yellow poplar and black locust. Some very good results have been obtained with these species, and further experiments to determine the conditions and the species for which planting is indicated will doubtless be called for as time goes on. Cooperative experiments made by the Appalachian Forest Experiment Station and the Champion Fibre Company, of Canton, N. C., have shown that with certain precautions the artificial sowing of yellow poplar seed in seed spots will be successful.

The destruction of desirable reproduction of such species as poplar as a result of cattle grazing has been noted from time to time in the mountains. A canvass which was recently made, however, indicates that in the greater part of the mountain territory woods grazing is so light that the aggregate damage is not likely to be material. Where the damage from this source is most pronounced and most serious is in the fenced woodlots. Here a few cattle may entirely destroy the hardwood regeneration and may even eradicate by trampling the reproduction of the pines.

Whether we consider the subject of hardwood regeneration as a whole or separated into its parts, its importance justifies the most earnest efforts to learn all there is to know about it. How to control the composition of the stand and shape it, economically and effectively, for the production of the most valuable yields involves a large fund of knowledge which we are only just beginning to gain. For yellow poplar, for example, we have learned that the seed will germinate in quantities after having been stored in the decaying leaf litter on the floor of the forest for at least one and possibly for several years. This probably also holds true for many other species, perhaps for locust, sumac, sassafras, sour gum, dogwood, grape vines, and others. For the oaks we know that the acorns may easily lose their germinating capacity by the evaporation of a part of their moisture content. We know that the reproduction by seed of most species, desirable as well as undesirable, is favored by contact with mineral soil, by moisture or protection from evaporation, and by a good supply of light for the germinated seedling. Further than such general observations as these, which are as yet few and far between, our present knowledge does not take us.

If timberlands are to be managed with surety of food regeneration—which is the very heart of successful timber growing—there must be available a fundamental knowledge of the life processes relating to reproduction of all the species with which forestry has to deal—and this includes the so-called "weeds" as well as the species of unquestioned intrinsic value. The study must go deeply into the measurement and proper assessment of the factors of temperature and moisture which control seed storage and germination. The forecasting of years of abundant seed production for the different species ought to be made possible by a study of the factors which affect it. The leaf litter on the forest floor, which may preclude or enhance the germination and establishment of seedlings, is an important subject for investigation. The means of encouraging or of discouraging sprout reproduction should be studied, as well as the rate of early growth of seedlings and sprouts of the different species, which determines their success or failure in competition with each other. All this information is basic to the intelligent treatment of the forests, and though it will take many years of plodding study to obtain it, every bit of authentic knowledge will be worth the effort to acquire it.

Meanwhile, forest management should give attention to regeneration according to the best lights available. The pertinent facts at hand may be briefly listed. First of all, fire protection, constant and effective. Second, reservation of a seed supply of desirable species when the stand is cut. Third, reduction of crown shade and of the seed supply of undesirable species, together with the removal of defective trees to the extent possible. Fourth, the control of the regeneration by release cuttings, which should be regarded as an investment, less expensive than planting. And fifth, the prevention of the destruction of young growth by livestock in fenced woods especially during or just preceding the time when the stand is cut.

Observation of these measures will result in the restoration of thrifty and valuable woods where only continued deterioration could otherwise be expected.

DIAMETER LIMIT CUTTING IN SOUTHERN PINE

R. D. FORBES, *Director, Southern Forest Experiment Station*

Among the first questions asked by any Southern pine lumberman who undertakes to practice forestry on his properties is this: shall I cut my timber clear, leaving only a few trees for seed from which the forest will reproduce naturally, or planning on renewal of it by artificial means, or shall I cut the larger trees alone, leaving the remainder for growth and seed? Since it is the function of the forest experiment stations to furnish answers to just such questions as these, the Southern Station has devoted considerable thought and some field time to the problems involved. Although the work which we plan to do in the future will certainly amplify and perhaps change our conclusions, I have set down on paper some of our present ideas on diameter limit and similar partial cutting methods. Let me remark at the very beginning that such work as the Southern Station has done is not mine wholly, or even chiefly, but has been participated in by most of the members of our staff.

There are two angles from which we must view the proposition of cutting Southern pine forests to a diameter limit. We must know first of all what the effect upon the future of the forest itself will be, and second, what practical difficulties will be involved and what they are likely to represent in dollars and cents. In academic terms, we must study both the silvicultural and the economic side of the question. Properly speaking a forest experiment station is not concerned with more than the former—how the forest itself behaves—but since no one, not even Uncle Sam, can apply to our Southern pine forests methods of harvesting the present crop which are mechanically impossible or unreasonably expensive, it is impossible to escape at least a brief discussion of the latter, or business side of the question.

How The Forest Reacts

What happens to a Southern pine forest when cut to a diameter limit? First of all, be it said that no rigid use of a diameter limit is ever good forestry. That is, to go out into a forest of any species, North or South, East or West, and to cut without exception all trees above a given size, or diameter limit, and to leave all below, is to blunder seriously. It is not scientific by any test, much less the one that I wish all people might learn, the standard long ago set for science by the great Huxley. It was Huxley who framed the immortal definition of science which in great black letters on the wall greets the visitor in the Forest Service headquarters in Washington: "Science is nothing but trained and organized common sense." No process can be scientific which fails of being common sense, and it would not be common sense to spare in logging merchantable trees afflicted with serious rot or certain to die from some other cause before the area could be cut over again, simply because these trees were below the chosen diameter limit. On the other hand, if natural reseeding is being relied upon, it would here and there be plainly necessary to leave for seed certain trees above the diameter limit, where no smaller ones were available for that purpose. A certain flexibility in application is vital to any common sense use of a diameter limit, and throughout this paper it is assumed that the limit is to be so applied.

Natural Conditions Favorable

The Southern pines lend themselves naturally to cutting to a diameter limit. This is not quite so true of second-growth stands, or those under very poor growing conditions of soil or climate, but as a generality we believe it holds very well. If the forest reproduces satisfactorily when so cut, and if the reserved trees grow vigoriously thereafter, the method is a success. To begin with, the Southern pines are not particular as to seed bed conditions. That is, their light, wind-borne seed seems rarely to be prevented from reaching the soil by the accumulation of pine leaf litter on the forest floor. Certainly any substantial opening up of the stand by cutting would reduce the leaf fall from the trees remaining, sufficiently to eliminate the danger that their seed could not find their way to mineral soil. Secondly, the demand of the seedling pines for soil moisture and for light during such a period as a stand would be apt to await another cutting, following that to a diameter limit, is not too great to prevent the healthy development of saplings in openings made by the cutting. It is true that there is a distinct tendency of larger trees to prevent, through severe root competition (not light competition), the growth of saplings and small trees for ten or fifteen feet all around them, but this effect is lessened, we have reason to believe, by fire protection, which improves the soil conditions and gives the young pines more resistance. Thirdly, the smaller, and particularly suppressed, trees in any pine stand seem quite capable of increasing their rate of growth when released by cutting from the competition of larger neighbors. I will discuss this in more detail in a moment.

Because the pines are able to reseeed in leaf litter, because the young trees are able to stand considerable shade and root competition, and because suppressed trees recover rapidly when released, virgin forests of Southern pine lend themselves naturally to diameter limit cuttings. They are made up of individuals, and more often groups of trees, of varying ages and corresponding size. The exceptions in natural stands are those which follow hurricanes and rare bug or fire killings; in these the trees are all of one age, or thereabouts, although they differ considerably in size. The virgin shortleaf pine forests are today in better shape to be cut to a diameter limit which will make possible a second cutting in twenty to twenty-five years than the virgin longleaf stands. The latter lack a good representation of smaller and younger trees. This appears due to fires, which for fifty years or more have burned so nearly annually as to prevent young trees or groups of trees from filling the opening left by the death of each of the constantly dwindling number of mature trees. Fires have not been as regular or widespread in the shortleaf region.

How Fast Will The Pines Grow?

The nub of the whole matter, so far as the behavior of the forest is concerned, is not, however, whether a diameter limit cutting will result in some increased growth of the released trees and good natural reproduction. Good natural reproduction, we are convinced, can be secured by a rather limited number of mature trees for seed. The Southeast is not obliged to resort to very careful partial cuttings in order to be sure of natural reforestation, as is apparently true in the Western yellow pine forests. It is the rate of growth of the released trees that will determine the usefulness of this method of cutting to the producer of Southern pine. This rate of growth, unlike the rate of growth of even-aged stands, cannot well be expressed in tables for general use. The Southern Forest Experiment Station, in cooperation with the National Research Council and the State Foresters of the South, it is only now completing a five-year study of the rate of growth of Southern pines in even-aged, fully stocked, second growth stands. We will shortly publish tables showing how many cords of wood or board feet of lumber may be expected at any given age from second-growth trees which, starting all at one time, are neither in too crowded nor too open stand, and are, therefore, producing wood at the maximum rate per acre. The growth of trees in all-aged stands, such as are produced by diameter limit cuttings, is much harder to predict, because it varies with the diameter limit used and with the proportion of the stand which is removed. It of course varies also with the species of trees and the combination of soil and climate which we foresters for convenience call "site;" these variables are encountered in the study of even-aged growth also. The Southern Station is by no means ready to make detailed predictions of the growth of our pines following diameter limit cuttings, because it is only on the threshold of the necessary studies, but I am glad to be able to give you the significant results of our recent study of one particular tract.

Results On Kaul Tract

In 1902 the Kaul Lumber Company, of Birmingham, Alabama, asked the United States Forest Service to examine its longleaf pine forests in north central Alabama, and to inform it of the probable results from various degrees of cutting. The company was not then particularly hopeful of keeping fire out of the cut-over lands and obtaining thereby a crop of young trees to take the place of those removed. It did want to know what growth could be expected if no trees below a specified size were cut. As earlier remarked, rigid observance of a diameter limit is not first-class forestry, but in view of the very general indifference of Southern lumbermen to forestry at that time the Kaul Company deserves considerable credit for applying even—a crude system of scientific practice to its cuttings of 20 years ago.

A resurvey, made under the direction of Mr. E. L. Demmon of the Southern staff, of portions of the companie's holdings cut over an average of twenty years ago shows that from areas cut to a fourteen-inch diameter limit about 10,600 board feet, Doyle Scale, were removed, and on other areas, where the plan of conservative logging was not followed and cutting was to a 10-inch limit, about 11,800 board feet. The original stand on the two areas was nearly the same. The more conservative cutting left 712 feet per acre by the Doyle Scale, which gave no volume to any tree below 10-inches in diameter, 4½ feet from the ground; the heavier cutting practically gutted the land, leaving but 84 feet per acre. Twenty years later the 712 feet on the 14-inch limit cutting had increased to 1665 feet. Using in place of the Doyle a scale which reflects pretty accurately the number of board feet that may actually be sawed out of the trees, we found 3132 feet standing on the average acre. Twenty years, in spite of repeated fires, had increased the 84 feet on the 10-inch limit cutting ten-fold, or to 883 feet, 2046 feet is the estimate of what may actually be sawed out today.

More encouraging than these per acre figures, and probably more useful to any one interested in applying a diameter limit to his own timber, is the data obtained on growth of individual trees. It has not been practicable so far to separate the 318 trees measured for growth into classes which reflect the degree of release, that is, which correspond to certain distances to which competing trees were removed. However, we did find that unless the trees cut stood within thirty feet of one left standing, the standing tree continued to grow at the old rate; in other words, its growth was not stimulated by the removal of the others. Since 48 trees can stand evenly spaced 30 feet apart on an acre, and since about 55 pine one inch in diameter remained on the average acre after cutting, it will be clear to any one familiar with the irregular spacing characteristic of the Southern pines that not all of the trees, by any means, were released. Nevertheless, the average tree was greatly stimulated, the small more than the large. Growth in diameter for the 10 years before cutting had been very uniform—from .85 to .95 inches, or about 22 rings to the inch—for all sizes of trees. For an average of two years after cutting the trees grew at the old rate. But in 8 years more, or a total of 10 years following cutting, 4-inch trees (4 inches at time of cutting) had grown 2½ inches; 6-inch tree 2 inches; 8-inch trees 1¾ inches; and so on tapering down to a little over an inch of growth in 17-inch trees, which therefore grew only about 20 per cent faster as a result of cutting, as contrasted with ·168 per cent faster in the case of four-inch trees.

For convenience and ease of comprehension we have put on the wall chart the figures just given, and further data showing the growth of the various sizes of trees in twenty years following cutting. Summarized, the information is this: trees at 4 inches at time of cutting grew five inches in twenty years; 6 inch trees, 4 inches: 8 inch, 3½ inches; and so on down to 2 inches of growth on 17 inch trees. We have also worked out volume increases in cubic and board feet, but I will not present them here. It is enough to say that 14 inch trees, for example, which averaged 100 years old at the time of cutting, increased nearly 50 per cent in board foot volume in the twenty years following cutting.

The growth figures for the Kaul tract may or may not be applicable to any other tract. Had the diameter limit been different, a greater or less proportion of the stand would have been cut, and the remaining trees would have been released to a greater or less degree. One thing is certain that a more flexible application of the limit would have given better results. From the trees on this tract and on many others the figures from which the Southern Station is now analysing, we are certain that trees in groups must be thinned out before anything like a uniform stimulation of growth can be expected. Again, it is self-evident that diseased, spike-topped, or otherwise handicapped trees are not worth leaving for future growth, and should be taken in the first cut if merchantable. Since the longleaf pine in north central Alabama is at the extreme of its northern range in that state, we feel reasonably confident that response of longleaf pine to a diameter limit cutting there would not be greater than well within the tree's range. This, and the fact that the limit was mechanically applied make us regard the rates of increased growth as conservative.

Diameter Limit In Second Growth

Applied to a second-growth forest, such as the typical old-field stands of this state and North Carolina, a diameter limit cutting would again give different results, and probably poorer ones. This is because most second growth is even-aged. That is, unless the second-growth comes up rather raggedly, crouding forces the struggling young trees to drop their lower lmibs early, and if only the larger trees were cut from such stands the remainder might have so few live limbs as to be unable to respond promptly and vigorously to the sudden increase in light above, and of soil moisture below. If cut for cordwood or pulpwood, and therefore before the full effect of the crowding was reflected in shortened crowns, these stands would do better under a diameter limit cutting than if developed for saw-logs. Diameter limits applied to young stands would result in something resembling a thinning by the French, as opposed to the commoner German, system. A year ago the Southern Station established some long term studies of cutting young stands to a diameter limit, and of real thinnings by the French system.

Whether the sum total of wood produced, if a forest is cut continuously to a diameter limit, is greater than if it is cut clean at intervals and reproduced to an even-aged stand is a question which far over-taxes our present knowledge. The chances are that the amount of wood fibre grown is the same in both cases. In all-aged forest which results from repeated diameter limit cuttings the wood yearly produced is distributed as a comparatively thin layer over a very large number of trees of all sizes and degrees of merchantibility. In the even-aged forest which results from clear-cutting, the same amount of wood is distributed as a thicker layer on a much smaller number of trees, at least after the first few years. The latter distribution results in a larger amount of merchantable volume becoming available for cutting at such a time as any trees at all have reached cordwood or saw-log size, but before that in a complete lack of merchantable trees. Under a diameter limit system there are always some trees of usable size, and the quality of the wood is higher for many purposes, because of its finer grain. The arguments pro and con might be spun out indefinately, to no purpose except to induce sleep on your part.

No Practical Obstacles

The practicability of diameter limit cuttings I can discuss very briefly, because after all it is a matter which each lumberman or landowner must figure out for himself. But taking the Southern piney woods as a whole, it is safe to say that no broad condition prevents the use of a diameter limit in cutting. We do not have generally in the South the logging difficulties which in some regions compel clean cuttings at long intervals in place of partial cuttings at short intervals. Unless it be in swamps like the Dismal and Okeefinokee and a few hilly regions such as occur sparingly in every Southern state, pine timber is accessible and easy to log. Stands averaging several thousand feet to the acre are heavy enough to allow of partial cutting. The cuts and fills of old logging trams remain in astonishingly good shape for years, in spite of the 50 inches of yearly rain which makes our Southern forests grow so fast. Even if at least a restricted use of railroad logging to large mills should prove unwise, the steady development of dirt roads will make possible the establishment of smaller semi-permanent mills throughout the piney woods. Water for the boilers for such mills is generally available, or gasoline power may be used. One of the astonishing phenomena of the Southern pine industry of the last five years is the development of small portable mills which send their rough lumber sometimes 20 miles over country roads to the planer or railroad shipping point. Like every other innovation, ancient or modern, against which sages have thundered, the portable sawmill results in both good and evil to the cause of forestry in accordance with the manner of its use. In my judgment it may prove extremely valuable to those who are cutting their woods to a diameter limit.

An Individual Matter

The length of the life of the individual operation will, of course, limit the possibility of diameter limit cuttings or, in fact, any other plan for timber growing. With only a few years of life ahead of it no sawmilling organization as such is going to be helped greatly by adopting a diameter limit, although as a landowner it may well inquire into its use. The only angle from which the short-lived mill might view diameter limit cutting with immediate interest is that of returns on the cutting of small trees. As has been shown by Ashe in the Southern territory, cost of logging the "little stuff" pyramids as the ten, eight and six-inch trees are reached. Not only do costs mount, but the value of the product from the smaller logs falls off. The Dierks Lumber Company of Kansas City made a test run of nearly a thousand logs at their efficient Oklahoma mill about a year ago, and I am privileged to take from this remarkable and far-sighted study the F. O. B. values per thousand board feet of lumber sawed from logs of varying sizes: 6 inch logs, $23.93; 8 inch, $24.64; 10 inch, $27.49; 12 inch, $31.35; and so on up to extreme values of over $40.00.

In closing, let me say that the best possible proof the Southern pine manufacturer could have, that cutting to a diameter limit is a practicable scheme, is its use under a variety of conditions by several successful lumber companies. Mr. Watzek's presence here saves my commenting in any detail on the diameter limits used for the past few years by the Crossett Lumber Co. in shortleaf pine and for the past sixteen years by the Jackson Lumber Co. in longleaf pine. The Dierks Co., already mentioned, the Southern Pine Lumber Co., of Texas, the Urania Lumber

Co. of Louisiana, and the Tanum Lumber Co. of Mississippi, among others, are applying a diameter limit in one degree or another, to their holdings. Diameter limits, judiciously applied to Southern pine cuttings, are a very hopeful means of prolonging and perpetuating the pine forests of the South.

REFORESTATION AND THE LUMBER INDUSTRY

J. W. WATZEK, JR., *Vice President,*
Crossett Lumber Company, Crossett, Ark.

The lumber industry in this country is definitely dependent upon the proper practice of forestry. The lumberman is more than anxious to see his business become a permanent one. He will do more than his share of the work, willingly, to make forestry a success, but the people of America must lend a ready hand. Taxation, both local and federal, is reforestation's greatest enemy. The marked tendency of local taxes to increase is threatening its very foundation. Each State that passes proper forestry legislation does itself proud, and it is rendering untold value to the country as a whole. If given time and opportunity the people of the United States decide all issues correctly: They will not fail in this instance.

Some one, however, must take the lead and it is the Lumber Industry's duty to do this. The Industry must show its good faith in reforestation by practicing it wherever it is economically possible to do so, rather than to wait for the people of any State to first pass a forestry law. We have not such a law in Arkansas; nevertheless we are thorough believers in reforestation. This is due primarily to the fact that we have faith in the people of the State, and know that they eventually will see the importance of such legislation and pass proper forestry measures.

Just how we became instilled with the idea of forestry, and also how we have tried to carry these ideas out, with a discussion particularly of some of the newer developments, may be of interest and also helpful to some of the people present. These statements are not being made with the idea that we are doing more than anybody else, for this is not true. We only wish that it were possible for us to do a more thorough job of it than we are doing.

Some thirty-three years ago our parent company, the Fordyce Lumber Company of Fordyce, Arkansas, was practicing forestry without knowing it. The lumber market was poor, and in the early years of operation only the largest and the best trees were cut. The percentage of uppers ran as high as 60 per cent. Logging was done by horses, and thus the stand that was left was not damaged to any great extent. As the market for Arkansas Soft Pine improved, cutting became closer; but even so, as the years rolled along many 12 and 14 inch trees were left because it was not profitable to manufacture them into lumber. This practice of conservative logging, forced by economic necessity on the Fordyce Lumber Company, had a far-reaching effect. After the first ten years' operation of this company the growth of the young timber on its cut-over lands started. to become noticable to the eye; thus, when another Arkansas and an Alabama Company were started, in 1901 and 1902, it was decided then that the conservative policy of cutting in the woods was practical and should be carried out at the two new plants. A diameter limit was established and no trees under 12 inches were taken at any of the operations. This diameter limit was raised, from time to time, until it reached 18 inches at one operation.

About this time, some thirteen years ago, the Yale School of Forestry went to Crossett for their practical field study. The boys were under the direction of Professors H. H. Chapman and R. C. Bryant. The influence that this group of young men had upon the company was remarkable. The first real seed of scientific forestry was sown at this time. Too much credit cannot be given the Yale School of Forestry for all they did then and have done since for us.

A few years later Austin Carey of the United States Forest Service appeared at Lockhart, Alabama. He spent a few days visiting, and since that time has been back practically every year. Through his efforts the seed of scientific forestry was very ably sown at Lockhart. We wish to thank the United States Forest Service, and particularly Austin Carey. for this real work.

These seeds started to sprout and the first result was a decision to have a complete survey made of the cut-over lands at Crossett, to determine what was on the land at the time of the survey and how fast the timber was growing. A crew of ten undergraduate foresters worked for two years, during their summer vacations, on this forest survey, under the guidance of Professor H. H. Chapman. Details of how this work was done and carried out will not be gone into here, but suffice it to say that it showed such encouraging figures that the Crossett Lumber Company decided to practice forestry in earnest and as scientifically as possible.

A forestry department was established under the guidance of a graduate of the Yale School of Forestry, who had also received a year's post graduate training in Sweden. Sweden, as you all know, leads the world in forestry, and their methods have been used to a great extent by us from the start. The keynote of Swedish forestry is to help nature in every way to reproduce the forest. This, on the face of it sounds simple, but it is not, and if any manufacturer believes that he can reforest his land without a real effort on his part he is very much mistaken. When the manufacturer comes to the forester for advice the forester should not be afraid to tell him the whole story. It is appreciated that the idea of forestry is comparatively new and that the foresters have had to paint the rosy side of the picture to get a hearing. A great mistake will be made if this practice continues too long. The manufacturer welcomes sound advice on how to produce a new forest. He will not consider it sound advice if he discovers after a few years of practicing forestry that the new forest cover is not coming because of the proper kind and size seed trees, for instance, have not been left. The forester may have recommended the right kind, but he too often stops there. He should have fought for them. It is gratifying to read such articles as the one appearing in a recent issue of the American Lumberman, written by Mr. W. W. Ashe of the United States Forest Service. This article points out so aptly that the second cut is the crucial test of forestry, and that if it is to be made successful more fast-growing trees of the merchantable size (at the present time) must be left. The manufacturer is anxious to know by detailed study just how much of this kind of timber should be left during his virgin cut. There has not been enough information available for the manufacturer, to show the value of producing quality over quantity. Take, for instance, an acre that has left on it one 8 inch tree and another acre that has left on it four 4 inch trees. In twenty years' time the four 4 inch trees will show a total volume of some 93 board feet, and the 8 inch tree but 70 board feet. The acre with the one 8 inch tree in it in twenty years, however, will be the more valuable acre. Manufacturers definitely need help in working out this problem as applied to their particular cases.

Our fire prevention program is progressing. During the first year, as well as the second year, results that we obtained were not any too encouraging, but the farmers in our community are now definitely seeing the light. Most of our efforts have been directed toward the second generation, and we feel certain that when the present children become men and women they will be staunch advocates of the slogan "Prevent forest fires; it pays." Results last year, even though it was an exceptionally dry one, showed that the present generation also are fast becoming converts, and it would not be a surprise if the present farmers are co-operating practically 100 per cent with us in the very near future. This has not "just happened," but has been brought about by hard work and effort.

Equipping our logging locomotives with oil, as well as our loaders in the woods, has been the second big factor in reducing the number of fires. Fortunately it is cheaper for us to burn fuel oil than coal at the present price of oil as compared with coal. If this condition should reverse itself at a future date we doubt very much whether we would ever go back to the former hazardous method of firing with coal. Oil has worked out particularly well on the loaders, for the engineer does not have to stop his real work of loading to fire his boiler. The semi-automatic fuel oil burner keeps the steam pressure uniform.

In spite of all the caution taken to prevent fire, fires will get out, and we deem it a good investment to spend some fifty cents an acre pulling back tops of fallen trees from timber that is left standing, and also lopping down the branches of any big tops, so they will not remain as a fire hazard.

The territory is also being broken up into blocks. This is being done quite successfully as well as cheaply by keeping some of the old right-of-ways clear and turning them into wood roads wherever possible. This running of fire lines is a most important work.

All of our trees are spotted in advance of logging operations by trained foresters, and the cutting is therefore not left to the discretion of "flatheads." In Arkansas we have two types of timber, one of the old virgin stand in which very few small trees exist, and another type which consists of fairly young timber standing quite thickly on the ground. In the first type at least two seed trees are left per acre. These are real trees that are capable of producing an abundance of mast the first seed year after logging. In the second type, where the stand is younger, thinning principles are applied and enough timber is left of sufficient size to make it profitable to log this timber some twenty years from now. The stand, however, is opened up enough so that the seed from these trees will germinate and produce a new forest cover. During our second cut the seed trees that have been left on the seed-tree type of area will be taken, inasmuch as they will have produced enough seed to start a new forest cover on this area, and the trees that we are now leaving on the other or second-cut type of area will also be logged.

The most important problem ahead of us at present is the production of quality timber for a second cut. If our second cut is successful, (and if it is to be a success the ground must not be taken too clean at the time of the second logging), we feel that we will be over the hill and a permanent operation will be insured. This is driving home to us the importance of carrying out thinning operations along the most scientific as well as practical lines. We are not thinning any place where we cannot make a thinning pay for itself—plus a reasonable profit. A great deal of work has been done in developing a market for this small type of timber, and the progress that has been made in manufacturing it in a billet mill has been gratifying. Opportunity to dispose of it as pulp is fast looming on the horizon, and this will mean another outlet.

One fundamental policy is never lost sight of, and this policy is—to have the ground produce as heavy a stand of young timber as possible. In our seed-tree areas, the stand in some instances is not coming as fast as we would like to see it. This is partially due to the fact that the stand has opened up too much, and we are therefore leaving a larger number of seed trees to the acre wherever the soil requires it. If this is not possible because of the fact that the trees are over-mature at the present time, we are scraping the ground to make a better bed for the seed. Fortunately, it has not been necessary for us to actually plant seedlings in order to get general reproduction. The beautiful part about getting as heavy a stand as possible started is that it insures not only quantity production, but also the all-important quality production. This quality production cannot be stressed too much. The Swedes pay more attention to it than any other one thing. A person can drive for days through their forests and see thinning operations along the road at every turn. Small poles for charcoal, firewood and pulpwood are being taken out. Last summer the most profitable by-product of thinning in Sweden was firewood. This is surprising, when as much timber exists as does in Sweden; nevertheless it is a fact. Our company had their first intimation of this same firewood market last fall. Due to close working, enough mill refuse was not available to supply the local demand for firewood, and the townspeople had to buy cordwood from the farmers.

Looking toward the future, we are endeavoring to so shape our operation that after our second cut, and maybe before, we will have our wagon roads as well as railroads in such shape and so located that it will not be necessary for us to have all of our logging operations going on in one particular area at one time. We hope to be able to cut where a stand is ripe or needs thinning. With the coming of better roads, and the development of not only truck logging but also the use of tractors, it may be feasible to do this. This is an ideal condition, of course, as far as forestry is concerned, but it can only be carried out if it is economically possible. It is being done successfully in Sweden, however, not only in districts where streams that may be driven exist in abundance, but also in districts where the logs must be hauled to the mill.

Looking further toward the future, the very closest co-operation between manufacturer, consumer, the Government and the people at large should be fostered. Conservation is just as much a part of forestry as the actual growing of trees. Proper manufacturing methods to obtain the most footage per acre should be carried out by the manufacturer, and the consumer in turn should lend his helping hand by being willing to use odd length stock. Manufacturers should not be cutting interior trim and matched lumber to even lengths of two-foot multiples. The waste in doing this is enormous, and the only reason it is being done is because of obsolete trade practices. The Government is making marked progress, through Mr. Hoover, in trying to break down these unscientific methods. The application of the above principle, as demonstrated by some of our own operations, shows an increase in footage yield per acre of from ten to thirty per cent, which is the equivalent to growing from 1000 to 1500 feet per acre. If the people of the United States understand the problem, and the Government and the Lumber Industry should see that they do, definite progress will be made each year toward its solution. So much more will be accomplished this way than if we come to a point where the country is suddenly alarmed over the shortage of timber supply and passes drastic measures that will be burdensome to all. We never want to arrive at this point. It never will be reached if all co-operate toward the common end of growing new timber as well as conserving what we now have.

FORESTRY AS PRACTICED IN EASTERN NATIONAL FORESTS

R. M. EVANS, *U. S. Forest Service*

During the calendar year 1924, the Government made more than 13,000 sales of timber from all the National Forests. Each one of these sales was a separate transaction complete in itself. In size they varied from small sales of five to ten cords of chestnut extract wood which the mountain farmer could get out in about thirty days with his ax, his rickety wagon and his old gray mule as his sole equipment, to great watersheds of 500 million to a billion feet of saw-timber, covering 25 to 50 thousand acres of land and involving several million dollars initial investment in railroads, mills and other equipment and requiring 20 to 30 years to cut. Now this is a pretty big business, but it is petty indeed compared with what will develop when the thousands of lumberjacks now engaged in felling privately owned stumpage reach our woods. We are dealing now with the vanguard only, but the main body is just a few years behind it.

How does the Government sell timber anyway? Without going into great detail the answer might be about as follows:—

When sales business develops or bids fair to develop in some part of a National Forest—a major watershed, perhaps, or the territory tributary to a permanent transportation system—a timber management plan is prepared. This plan takes stock of the timber, determines the rate of growth, sets forth when, where and at what rate cutting shall take place, outlines the silvicultural and timber-sale policies to be followed, in short, gives the Forest Supervisor or other officer a clear-cut statement of how he is to manage the timber for which he is responsible.

The Supervisor, then, upon receiving an application for the purchase of timber, knows what tracts he has for sale, and after interesting the would-be-purchaser in some one of them makes a careful estimate and an appraisal which sets a fair value for the stumpage, taking into account the costs of logging, manufacturing, etc. This fair value is the least value which the Government will accept. The timber is then advertised for thirty days or longer, in local papers if the sale is small and of local interest only, in trade journals and papers of wide circulation if the sale is large enough to be of regional interest. Every effort is made to secure competive bids and before a contract is awarded all possible opportunity is given prospective purchasers to become familiar with the logging chance in question. But the right is reserved, and on occasion exercised, to reject the highest bid if its acceptance might lead to monopolistic control of local markets, or if on other grounds the public interests might be unfavorably affected. Sealed bids to be opened at a stated time are submitted and, following the award of the sale, a contract is executed. This contract gives the amount and kinds of timber and its location, the price, the minimum and sometimes the maximum rate at which the timber shall be cut, describes how the timber shall be marked and scaled, what shall be done with the brush, enumerates the various necessary measures in the way of fire protection, and such other special features as need to be covered in the particular case. In all large sales and sometimes in small ones a bond is required. The timber is not paid for in a lump sum but in installments in advance of cutting, each installment covering not less than two month's cut. From the purchaser's standpoint such a system of payment has obvious advantages.

Before any trees are cut they are marked by a Forest Officer. The usual method is to blaze the tree and stamp "U. S." on the blaze. Trees are marked for cutting with the idea of harvesting all of the mature and over-mature timber, leaving for the next crop the younger trees and sufficient seed trees of valuable species to assure reseeding of the ground left open by the logging operations. A Forest Officer scales the logs at the landing or in the woods, using the Scribner Dec. C. rule which is the standard rule of the Forest Service, except in a few instances, such as the White Mountains in New England where the custom of handling full tree lengths has made advisable the use of the solid cubic foot rule.

Brush disposal has for its primary purpose assistance in fire proofing the sale area. In general, hardwood brush is lopped and scattered and softwood brush is piled and burned. There are exceptions to both rules. Special fire protection requirements depend on the kind of logging (horse, railroad, donkey, etc.), and the particular dangers to be encountered. A rather strict application of such requirements has been found advisable, since, obviously, there is no need to invest in careful marking and expensive logging methods if later the investment, consisting of reproduction, young growth and trees left, to say nothing of soil fertility, is wiped out by a fire which might have been prevented.

This, in brief, is the way the Government sells its timber, whether in Virginia or in California. Throughout, three principles are constantly in mind—harvesting the mature crop, the improvement and safe-guarding of the next crop, and a profitable business for the purchaser.

So much for the general sales business of the Government; what I really want to tell you a little about is the timber sale business in our own territory, and what we are trying to do with the forest properties that have come to us—for in this you and I have a personal interest.

Of the eight National Forest Districts, this, the seventh or Eastern District is unique in several respects. Its boundaries embrace the largest territory of all, but the area of National Forest land is the smallest. Within its boundaries and tributary to its National Forests are 80 odd million people, or about three-fourths of the population of the United States; within its boundaries also is found the center of wood consumption of the country. It stretches from the Canadian boundary to the Gulf of Mexico and from the Atlantic Ocean to Oklahoma with Porto Rico thrown in for good measure. The commercial forests in this expansive district range from the dark spruce stands of Maine through the great oak, chestnut and yellow popular forests of the Appalachians to the open yellow pine woods of Florida and Arkansas. Some territory!

Nevertheless, there is a considerable volume of forest products in this District containing as it does some five billion board feet of sawtimber, half a million cords of tanbark, half a million telephone poles, four million railroad ties and an unestimated volume of fuelwood and other miscellaneous products;—a total volume in the neighborhood of ten billion board feet.

There are some sixty species of commercial timber trees and perhaps a third as many more which produce wood that is fit for use. About 25 per cent of the volume is over-mature and decadent, 40 per cent is fully mature and is no longer growing at a profitable rate, the remainder, some 35 per cent, is immature and though of small volume occupies a large area and will eventually furnish the future yield.

The Forests have suffered severely from the logging operations of the last half century and the forest fires of a hundred years or more. The soil on which the greater part of the timber stands is of great richness and strength for tree growth, and the climate both as to rainfall and growing seasons is almost ideal; it can be understood, therefore, why foresters estimate that the timber stands of the future, grown under the care of man and protected from fire, will be at least three times as great in volume per acre and many times more valuable.

Something over two billion board feet of the sawtimber and products is chestnut. You all know that chestnut is doomed by the blight which is marching southward at an ever increasing rate of speed. This presents a problem in marketing, utilization and wood technology which must be worked out with the wood-consuming industry, the Forest Products Laboratory and the many land owners who are involved in the same problem. The utilization of chestnut is a bugbear to both the forester and the lumberman and the avoidance of economic loss, due to its destruction, will continue to be the major problem in the Appalachians for several years to come.

The whole lumber industry has passed through almost a complete cycle in the eastern United States and there is no section or region where the transformation has been marked or more rapid than it has been in the Appalachians. This section was not the scene of large scale logging until the depletion of the Pennsylvania hardwoods was first felt back in the late eighties and early nineties. From that time and up until 1910, many large railroad and band mill operations were established. Naturally enough the labor of the region soon turned to woods work and furnished a more than adequate supply of trained loggers in a short time. Logging railroads were built and band mills installed and during the next 25 years the Southern mountains echoed the merry song of the saw and the axe, and prosperity reigned.

By 1915 the rapid exploitation of the mountain forests had petered down to a few large mills to be counted on the fingers of your two hands, and the Government started its acquisition of the cut-over land for its Forests of the future. It is with these lands that we are dealing in our Appalachian Forests.

The whole economic structure has suffered a considerable change since the heyday of the big operations. Lumber dealers, planing mills and wood-using industries were all built on the basis of large mill production. These are gradually reshaping themselves to meet the new conditions. A class of operators, able to handle small logging jobs, is being developed by the sales of National Forest stumpage. The portable mill has returned to a position of importance in the manufacture of lumber, and has brought with it brokers and wholesalers equipped to handle the output. The farming population adjacent to the Forests looks more and more to Forest Service timber sales as sources of employment during the off-seasons, all of which has a very important bearing on the handling of our timber resources.

Prior to 1914 there were no sales of stumpage in this District except in the public domain Forests of Arkansas and Florida. During the calendar year 1924, ten years later, there were some 1,400 sales, consisting almost entirely of salvage materials—stumpage that was regarded as practically worthless ten years before.

We have been busily engaged in building up these Eastern Forests by purchase, equipping them with fire tools, trails, telephone lines and lookout towers, perfecting the organization of trained forces to administer and protect them, and converting the attitude of the mountain farmer from one of forest destruction to forest conservation. We have contented ourselves, therefore, with taking care of the sales business which has come to us unsolicited;—we have not gone out after the business we believe exists. We feel certain the timber sale business of today can and will be expanded during the next ten years to several times its present size.

But even this expanded business, after all, is only the clean-up and salvaging operation designed to remove the last of the old crop of timber. All of our harvesting operations are made with the same end in view; namely, the improvement of the conditions of growth of the second crop. Artificial planting is the forester's last resort. Natural reforestation is the end to be sought. Fortunately throughout this District, Nature reforests abundantly when given intelligent assistance. Culled stands must make way for stands that will grow; diseased and decadent trees must be removed; young stands must be thinned, else competition will strangle all.

But in working out methods, we are confronted with many problems, both economic and technical. The same problems must be faced by the land owner who wishes to cut his woodlands with an eye to the future. We find that the intensity of our forestry practice is governed quite sharply by the demand for our products; we find we have much to learn about the proper treatment of individual stands; and, before all else, the fire problem must be effectually solved. We feel we are making progress. The rapidly changing character of the scrub oak areas on Massanutten Mountain in the western part of this State, the greatly increased amount of white pine reproduction in the Natural Bridge country, in north Georgia, and in many other places, bears witness to the value of fire protection. Increased sales have enabled us to place considerable areas in shape for rapid growth.

We wish the timberland owners of the region might have more first-hand knowledge of these things, gained through better acquaintance with our Forest Supervisors and visits to the Forests. Our Eastern National Forests are representative of nearly every type and forest condition. We would like to have them considered forest laboratories in which our common problems can be worked out.

THE SPORTSMAN'S INTEREST IN THE NATIONAL FORESTS

COL. H. L. OPIE, *Staunton, Virginia*

You will observe that I am presented to you as a "sportsman and editor." Both designations are gratuitious. I am not an editor and I doubt my qualifications as a sportsman. However, if a little hunting, a little fishing and a little soldiering, will make a sportsman of me, I may be able to qualify.

My subject is "The Sportsman's Interest in the National Forests." Strictly speaking, I am going to make my observations from the viewpoint of a hunter and a fisher with conservationist leanings, for I have long considered hunting, fishing and forestry as closely allied subjects. The haunts of both fish and game must be protected to produce the best results. We must preserve our forests and streams to enjoy good mountain hunting and inland fishing.

First, let us consider the angler's problem. The person not versed in such matters may well ask, "What has fishing to do with forestry?"

Picture in your mind's eye if you will, a great mountain watershed covering probably fifty thousand acres of virgin timber lands, high peaks and steep ridges, and low lying foot hills; valleys, coves and draws, pouring their little rivers and streamlets through a single watergap, as out of a neck of a bottle.

In its primitive state, this watershed was covered with forest giants, great oaks and conifers, hickories and chestnuts, mingled with lesser known varieties of forest trees, growing tallest and closest in the lower reaches of the mountains and sparse and shorter as they approach the ridge crests or outstanding peaks. Below their towering branches is the secondary timber; then the undergrowth and then the plant life, the weeds and flowers springing from the leafy mold of the forest mat—the carpet of leaves and decaying wood and vegetable matter that covers the floor of the forest, holds back the water against the dry season and feeds the streams and nourishes all plant growth. Such a forest swarms with animal and bird life and the pellucid waters of its streams and streamlets teem with fish life; the beautiful and toothsome mountain trout in the upper and more shaded and sequestered waters, the small mouth bass, the pike and other varieties in the waters below.

I am presenting for your consideration a wilderness paradise, untouched by the hand of man. There are few such left in our Eastern States. One must cast back many years to find a real one in Virginia. For man, the destroyer, with his axe and his sawmill, has done his deadly work in every quarter. The beauty of the wilds has succumbed to progress; the trees have been absorbed in the market place. It is with what we have left that we must deal.

With the entire area of the watershed cut over and the big timber removed, nothing remains save the smaller growth, the tree tops and slash. A period of drouth sets in. The sun which for ages, has attempted to penetrate the unbrageous depths of the forest, now searches every nook and crevice. The slash becomes as tinder; the mat curls and crinkles; all moisture is absorbed. Some wanderer drops a lighted match or deliberately starts a fire. The result is the same. With amazing speed, hills and valleys are swept by the devastating flames and charred and smoking acres by thousands are left in their wake. Such fires may burn for days and though oftimes turned aside, are seldom put out except in government owned lands, where there is an adequate patrol system. And in unprotected areas these fires occur year after year, more often in spring and fall, the soil being destroyed over great tracts, left to erosion, and carried off in unmeasured quantities to the main river bottoms.

When the rains fall there is nothing to hold the moisture. The ridges and hillsides become scarred with gulley washes; floods pass down to the lowlands, often causing great damage and loss of life.

But it is with the mountains and their streams that we are now concerned. With no forest mat to hold the water; no shade to protect it from the heat of the sun, all moisture quickly disappers. Sources of small springs and trickles dry up. In many cases streams which were bold and flowing the year round, become mere wet weather creeks, with here and there a stagnant, slimy pool, in which only algae can live, during the dry months.

There are many such mountain streams once abounding in mountain trout, from which this species has disappeared, yet in many others the trout persists in the face of every danger and hardship. It is probably more tenacious of life than any other fish, not excepting the lowly carp, for no other fish can exist under such difficulties.

A child once asked its mother, "Mamma, where does the light go, when it goes out?" The harassed parent replied, "I don't know, darling. You might as well as ask me where your father goes when he goes out." It is rather a debatable question among observers of our mountain streams where the trout go when the *WATER* goes out. One of my angling friends insists that they climb the ridges, hide behind the logs and await the return of the water. The belief persists among many mountaineers that the trout follow the water as it disappears in the gravel and river rubble, coming out of the soggy bottoms when the water again rises above the surface of the earth. Both theories are of course fallacious.

What actually happens, I think, is this. In many cut over watersheds, the main streams, in periods of drouth, may go completely dry for long stretches, with sometimes a live pool here and there and sometimes running water, reappearing for a few hundred yards; but most of the small feeder streams of the close set draws and coves, never cease to flow. In winter and early springtime, there is a great rush of water from all sources and quite a torrent pours through the watergap. The trout which have been spawning in the feeder streams in the later summer and fall, come down with the cold winter floods, sometimes passing far below the mountains into the big waters of the open country. I have caught trout of goods size, five and six miles below the watergaps in several streams that go as dry as this banquet over the same bed for several months each year.

When the water falls, and the temperature rises, the trout, contrary to the habits of other fish, work up stream. That does not mean that they all move in a body in any one stream. The trout the fartherest down stream, probably reach only to the constant pools just above the watergap. Those alredy in this stretch may reach only a few miles higher up and so, on and on, until some literally climb the mountains. One may find trout ten or twelve inches in length, at times, in pools within a few hundred yards of the highest ridge crests, and scarcely larger than a bath tub. In the small feeder streams, thousands fall an easy prey to the wild animals of the forests, bears, coons and wildcats, and fowls of the air, and water snakes, while mountaineers also take a heavy annual toll. Yet the trout persists and offers the greatest of sports to the angler as he emerges from his winter chrysallis and greets the first zephyrs of spring.

It was Dr. Henshall, I think, who predicted that the mountain trout would soon become extinct for the very reasons which I have set out, and that the small mouth bass would be relied upon as our principal inland game fish. It seems to me that the opposite is coming to pass. In spite of the larger waters and less restricted habitat, the bass is disappearing and the trout is holding his own wherever he is given one half of one per cent of a chance. There will be good trout fishing in several protected streams that I know in National Forests this spring, while I do not know of a single one that will furnish bass fishing worth the effort.

I have probably given more space to the trout than the subject warrants. I have to confess to a personal weakness for this fish. Fishing is ever more alluring than hunting, to the real lover of the out of doors, anyhow. One always knows in advance, "How big is a grouse? How big is a turkey? How big is a bear?" but who in all time has ever been able to answer the question, "How big is a fish?" until he is brought from the water, landed and creeled? And Mr. Fish, increases in size, from day to day, from year to year, as the tale is retold, until he has reached monstrous proportions.

Next to the gentle art of fishing, the hunt claims attention and hunting is a subject which I have already closely associated with the National Forests.

Several weeks ago, I heard a prominent Virginian quoted as saying that the damage done by forest fires to game birds and game animals was largely sentimental, that it was more imaginary than real. Frankly, I do not think this gentleman knows much about the vast sweeps of either the Blue Ridge or the Alleghany mountains or the half million acres of National Forest tracts lying among them, in our own state.

When the nests of the grouse and the wild turkey dot the slash and undergrowth of the mountain sides and hollows, when the deer and other four footed game bring forth their young in the springtime—when these nests and these young are destroyed by forest fires, is the damage sentimental or imaginary? And does this not occur year after year in unprotected regions? Without elaborations on my part, I leave you to your own conclusions.

In dry autumal days when the forest fires have destroyed all signs of bird and animal food—the mast from the trees, the grapes from the vines, the seeds from the weeds, the laurel leaves, the creeping partridge berries and other greenery, the very shelter from cold and danger, offered by the underbrush in the natural game haunts, and have driven the furred and feathered inhabitants to less favored places to starve or fall an easy prey to human and natural enemies—is that a sentimental or imaginary damage? I think not. To me, it seems very real indeed, and no experienced hunter will be so foolish as to waste his time seeking game in burned over areas until long after the evidences of the disaster have disappeared, for he well knows that such a quest will be a fruitless one.

We have chiefly considered the effects of cut over and burned mountain tracts on game and fish life, where no effort at reclamation is made. Of course, the absorbing of these tracts into National or State Forest systems is the one strong answer to the problem. But that is not all. There must be adequate game and fish laws. There should be no running with dogs in the National Forest at any season of the year; no carrying of shotgun or rifle during the closed season; bag and creel limits should be strictly observed; restocking of forest and streams should be carried on systematically; there should be established, carefully selected fish and game refuges; barren areas should be seeded for game; fish and game wardens should work in closest cooperation with the forest wardens—and the spirit of good sportsmenship should leaven the whole.

The National Forests already offer the public carefully selected camp sites, with all attendant joys, and fair hunting and fishing in season, hundreds of miles of mountain drives and walks, but if these other things I have mentioned are put into effect there will be better sport for all, with rod and gun, for many years to come and lovers of nature will have a very real and personal interest in our National Forests and their future.

PRACTICAL REFLECTIONS ON FORESTRY

W. H. ANDREWS, *President, National Manufacturers Association*

I have attended this convention to hear scholarly and scientific ideas on forestry, and will return to my native state of Tennessee and try to pass on the ideas to the country people living there where the trees grow. My interest in forestry is not philanthropic but selfish, to the extent that the forest is the source of my livelihood and has been keeping my family for two generations back and will probably support two or more generations in the future. My father's family consisted of seven children and the money that fed, clothed and educated us came from the forest. My own family consists of my wife and eight children, and our source of existence and education comes from the woods. We have fifteen grand children, eight of them living on money derived from the forest.

At a meeting similiar to this about a year ago, the matter of leaf mold was mentioned as argument against forest fires. After returning home from the meeting I decided to find out just what there was to this theory, and had gathered from several square rods the leaves which had fallen in a tract of Oak timber. Weighing the leaves from each square rod separately and getting an average, I found there were more than fifty pounds of dry leaves per year produced on each square rod, which would figure four tons per acre. To find the value of these leaves from a standpoint of fertilizing value I had two separate analyses made, one by the state chemist at Nashville and the other at the University laboratory in Knoxville, with results which did not vary more than one per cent per ton. It was found that each ton of leaves had $4.45 worth of fertilizer ingredients therein; thus four tons to the acre make $17.80 worth of leaves per year, basing the ingredients of fertilizer at the same prices the farmers pay for fertilizer bought in sacks. Of course, it is not claimed that the leaves have anything like a value of $17.80 per acre as fertilizer for the trees, but they do provide a certain amount of nourishment and aid the growth of the trees. When a fire goes through the woods and burns the leaves most of the fertilizing elements are destroyed, at least $16.00 of the $17.80 worth, so you can see that forest fires not only damage the present growth but retard the future growth.

My test leaves were taken from a tract of land which has been under my observation and supervision for a period of something like ten years. The land was bought for $3.00 per acre, after which the railroad cross ties were cut from the suitable timber and since then a practical process of reforestation has been followed. A distillation plant afforded a market for the cord wood which paid a little more than the expense of cutting it from the tops and weed or worthless trees and removing it from the land. The process was to cut every tree twelve inches in diameter and over into cross ties and to make what was left into cordwood, that is, the tops and defective parts, other defective trees which were not good enough for cross ties, and those with bushy spreading tops which shaded too much ground. This left nothing standing but perfect and promising trees. Today, after ten years of this work, most of the acres on this tract have each 200 or more trees from three to twelve inches in diameter; one acre counted has 232 trees. The tract referred to contains 10,000 acres of which 6,000 acres have been developed as stated. A stand of 200 trees per acre means that the trees will stand about fourteen feet apart, which is as reasonable as an acre of corn with the hills four feet apart.

We know that we can cut over this land every 20 to 25 years and get a good crop of cross ties. A tree should be from 40 to 50 years old to make ties to good advantage, and cutting every 20 to 25 years there should be from 75 to 100 trees per acre which would make ties to good advantage. The smallest tree cut should be something like fourteen inches at the stump or twelve inches at the top of the first log; no tree should be cut which would not make from the butt cut a tie 7' x 9" x 8½", the next log a 7" x 8" tie and the third log a 6" x 8" tie and so on. This should be the minimum, many of the trees will make more ties of the different sizes. With these figures as a basis an acre will produce a carload of ties every 20 to 25 years. After trees become 40 to 50 years old they grow slower, and to get the maximum yield from an acre in, say, a century, the older trees should be cut as stated above so as to permit the younger trees to grow as fast as possible. Uuder this method no planting is necessary as the young oak saplings naturally come up, in fact, they may come too thick. If the trees get too large or too thick they will begin to fight each other for sustenance, and war means waste. It is quite important to cut out worthless or weed trees which will never amount to anything but which take as much space and nourishment from the ground as good trees.

There is no question but that forest fires are the greatest enemy of growing timber, not only because of the damage done to the trees but because of the destruction of the leaf mold and the great part of its fertilizer value. Forest fires can be eliminated to as great an extent as fires in the city or town. We have a tract of 5,000 acres from which the timber was cut seven years ago, and after cutting the timber we put a man in charge, and his compensation was a house to live in, the use of about thirty acres of cleared land, generally, in the valleys and richer spots, and a team of mules and a cow which we gave him, and also the fruit he could secure from a number of fruit trees we sent him to plant around his house. This land was to be his home with the understanding that he would watch the woods and keep fire out of them. His family consisted of a wife, two girls and three boys: the understanding was that they themselves would extinguish all the fires if they could but if outside help to fight fire was needed, we would pay for it. During the last seven years there has been very little fire on this tract, with only a few acres burned over, and we have had to pay only $30.00 for outside help.

In Tennessee we find that the Chambers of Commerce can be of great help in forestry work. Our Nashville Chamber of Commerce has a forestry committee of which I am chairman, and during the last session of the state legislature we managed to get through everything we asked for and when the next legislature meets we expect to ask for more. Four or five years ago through interest manifested in Tennessee forestry, the legislature passed a law requiring that forestry be taught in the public schools, but for several years the law was not observed. One of the first activities of the Nashville Chamber of Commerce forestry committee was to take this matter up, and among other things find a proper book to go into the schools, especially the country schools. A text-book committee was formed of two lumbermen who had formerly been school-teachers and myself. We looked over a number of text-books on forestry but they did not seem to suit us, so we got Mr. Maddox, our State Forester, and Dr. Parkins, of Peabody College, to prepare a book for the committee to examine and consider. This was done, and the book approved, and we think we have the best book available for teaching foretry in the public schools. The name of this book is "Our Trees and How They Serve Us," and if you are interested in teaching forestry through the schools I suggest that you get a copy of the book.

Personally, I am very anxious for the country boy to grow trees, and in this I have a selfish motive as I hope my grandchildren will continue in the tie business and get a profit from these trees. I feel that any boy who will personally plant as many as 25 trees will develop an appreciation of and interest in forestry work, and fight for those trees if necessary.

Another thing we are doing through the Chamber of Commerce is to organize county forestry associations, and personally I have organized five of these which seem to be successful, so much so that I have decided to organize one in every county in Tennessee where our company operates in about twenty counties. I try to interest the country people from a financial standpoint, telling them that my interest is to handle the products of the trees at a profit of from five to ten cents on every dollar and leave them the remaining ninety or ninety five cents. This argument seems to appeal to them and they are very much interested. These county associations work in cooperation with the State Forestry Commission of which I am a member. We try to have as presidents of these associations some good active lumberman in the county, and insist that the superintendent of the county schools be the secretary in order to work through him to see that the children get forestry education.

By keeping at these propositions we hope to make Tennessee the leading hardwood State of the Union.

STATE POLICY IN FORESTRY

WM. A. L. BAZELEY, *Commissioner,*
Massachusetts Department of Conservation

In coming into this Southern country and speaking on State Forest policy, I realize that I am some distance from home and that much that I have to say is colored by a New England background. There are many things, however, which are of equal application in forestry whether they are to be tried out north or south of the Mason and Dixon line and I shall make my remarks with this in mind.

The practice of forestry involves the curtailment of present revenue or makes present expenditure for the sake of future return and this return may be forty, fifty or sixty years hence. It follows, therefore, that only those institutions which are stable and which can look forward to the future with a certainty of existence can afford to practice forest management to the highest degree of perfection. It is the corporate community, whether the body be called Nation, State or town that has this necessary stability. Furthermore there are returns that come to a community from the practice of forestry where the revenue cannot be figured in dollars and cents. These returns may be of little value to the individual forest owner, but they are vital to the community and therefore it is the community that must make the investment which will assure them.

The individual citizen lives but a short time and wishes to secure the greatest satisfaction to himself during his life. He is necessarily selfish, ready to nelect the interests of his neighbors and still more the interests of the future citizen. Of course, I am aware that there are thousands of forest land owners, inspired more or less by altruistic motives, who desire to practice forestry and who should be given every encouragement. The attitude of the individual owner need not be that of the lumber or the pulp making corporation, for they should look forward to a span of life greater than that of the individual and should be interested in perpetuating their business provided that such forest management is not incompatible with the earning of a reasonable profit on their invested capital.

In Europe it was the towns and small communities that started the practice of forestry because in the seventeenth and eighteenth centuries these communities were the most stable organizations of government. It was only after political chaos gave place to some degree of order and permanence that State and Nation in Europe gave thought to State Forests and State Forest policy.

In this Nation, forestry has started at the other end of the scale, with the Federal Government, not because it was more stable than the State governments, but largely because forestry started in this country as a matter of scientific research. Furthermore it had on its hands millions of acres of public forest lands that were greatly in need of proper management and so it was able to go into the forestry business extensively with almost no expenditure of capital.

In New England, State forestry has closely followed the development of Federal forestry as the next logical step. During this time we have given considerable encouragement and publicity to town or municipal forestry so that to the outsider this development may seem to be more important than it actually is. The town is a permanent institution, yet in the average American municipality you will find the tendency to live in the present with small regard for the future. Also the rural towns which have the largest area of forest lands are generally poor and unresponsive to new ideas. There are exceptions to this rule and these exceptions are being led and encouraged to take up forestry, and it is quite possible that some day these exceptions may prove the rule.

The development of forestry in four of the New England States, Massachusetts, New Hampshire, Vermont and Connecticut has been more or less parallel. Massachusetts only leads by virtue of the fact that as the wealthiest of the States it has the more money to spend in carrying out these policies. When it comes to details I can name some things in which Massachusetts is not the leader. We regret the fact that up to the present our largest New England state, Maine, and our smallest, Rhode Island, have not gone as far as the others mentioned in a well developed forest policy.

In 1902, Dr. Fernow, the father of American forestry, wrote an article for the Massachusetts Board of Agriculture, entitled "A Forest Policy for Massachusetts." He summarized his recommendations and it is interesting to balance the recommendations against our accomplishments twenty-three years later. Number 1 was "the appointment of a State Forester." This was done in 1904 when the State Forester had two assistants and one clerk. In 1925, the State Forester has twenty-four permanent assistants, eight of whom are trained foresters.

Number 2 was the improvement of forest fire laws making them general under State supervision and cooperation. In Massachusetts the work of preventing forest fires through enforcement of slash laws, permit laws and railroad inspections is under the supervision of the State as is also the work of detecting forest fires by means of our forty observation towers. The actual extinguishment of fires, however, is done by the local towns at their own expense and entirely under their own control. In this respect we have not traveled as far as our sister New England States where fire fighting is a matter of State and town cooperation and the State pays one-half the bills. This is a condition which I am even now trying to correct by legislation. We expend annually about $70,000 in forest fire work, $12,000 of which comes from the Federal funds.

The fourth recommendation advises the acquisition by the State for owing to constitutional barriers. It stated that encouragement by financial aid should be given to all associations and educational agencies concerned in creating an active interest in forestry, a dangerous precedent no matter how worthy the cause.

The fourth recommendation advises the acquisition by the state for forest reserves of those cut-over lands and abandoned farm-lands which by their location and condition are of importance to the welfare of the State and do not promise to private enterprise sufficient inducement to care for them. Massachusetts has purchased already 100,000 acres of just such lands as State Forests at a cost of less than $5.00 per acre and is expending each year $150,000 in the purchase and development of State Forests.

Establishment of nurseries for the distribution of forest planting stock at cost is the fifth recommendation. We have three forest nursies out of which we took last year four million three and four year old transplants. One and one-half million of these were sold to the general public at cost ($7.50-$10. per thousand); one-half million given to town forests and the balance (two million) planted in State Forests. Masschusetts not only sells stock at cost to encourage private planting but has a law known as the Reforestation Act under which it actually takes over land, plants it and gives the owner ten years in which to pay for the work done. We are expending $30,000 per year in the production of nursery stock.

The sixth item in Dr. Fernow's report recommended that towns be encouraged to acquire forests and that the State loan money to the towns for this purpose. Massachusetts has had a law since 1911 which permits towns to purchase land for town forests and although the State does not loan money to the towns for this purpose, the law permits them to borrow money if necessary. The State Forester furnishes stock free of cost for planting on town forests and these trees amounted to half a million during the curret year. Sixty-five town forests have been established, containing 6,500 acres.

The seventh recommendation provides for encouragement to private owners to improve their woodlands by furnishing expert advise. This line of work has been carried on ever since the office of State Forester has been established and we have on record more than 2,000 examinations of farm woodlots made for the purpose of advising their owners. This sort of educational work has been supplemented from time to time by the publication of bulletins, the placing of exhibits and the giving of lectures. Since the passage of the Clarke-McNary law this educational work has been placed in the division of forest extension work which my department carries out in cooperation with the Agricultural Extension service at the Massachusetts Agricultural College at Amherst.

The eighth and final recommendation calls for the establishment of a just tax law. In 1912 the Commonwealth of Massachusetts amended its constitution making it possible to tax forest land separately from other property, and in 1920 the present forest classification law was passed. This law permits forest land with young immature timber to be taxed only on the value of the land itself and to pay a yield tax of 6 per cent when the crop is cut. The law is permissive and only a few hundred owners have so far taken advantage of it. It is simple, easy to apply and seems to put no great burden on the rural forest town. I have hopes that it may prove to be the solution of our vexing forest taxation problem.

It is interesting to note that twenty-three years after these recommendations were made by Dr. Fernow all except the third, which is constitutionally prohibited, have been carried into effect, a tribute to Dr. Fernow's ability as a prophet or to the intelligence of a State in following good advice.

There is one important problem in Massachusetts which the Department of Forestry has had to meet which Dr. Fernow did not refer to. For many years this State has had to fight two imported forest and shade tree insect pests, the gypsy and brown-tail moths. Since 1890 the Commonwealth has spent sixteen million dollars in the suppression of these insects and since 1909 this work has been under the direction of the State Forester.

Massachusetts invested last year $330,000 in the work of its Forestry Department. Perhaps New York and Pennsylvania can make a larger financial showing, but taking into consideration the fact that the area of these States, both general and forest land area, is about six times that of Massachusetts, our expenditures are relatively much higher. I do not put forward these figures in a spirit of boasting, but to spur on the Southern States, especially those that are just starting in with a forestry program, to greater and greater efforts year by year. We in Massachusetts have only made a beginning of meeting our forestry problems. You States of the South, with much larger forest areas, have larger problems to meet. The pinch of timber famine when it comes will be felt in the South as well as in New England and the time to prepare the remedy is now before it is too late. It will take organization, laws and money and you should not be afraid to ask for them.

SOME STANDARDS OF STATE FOREST FIRE CONTROL

LEONIDAS COYLE, *State Firewarden—New Jersey Dept. of Conservation and Development*
Presented by
State Forester Wilbur

State forest fire control should be state-wide in scope having a general policy applicable to all public and private lands in the State to which forestry can be applied. It should have for its object the reduction of fire loss to a point where the value of the timber burned annually, plus the annual cost of the control organization is not more than, let us say, 1 per cent of the total forest capital, or to a percentage so small that insurance companies will ordinarily insure at a rate which will pay the forest operator.

There are two activities which will work to bring this about. The first and most direct, and therefore the most important, is fire extinction and the second, less direct, is fire prevention. The two go hand in hand and can and should be the work of the same organization and the same individuals.

Fire suppression, or extinction as it is often called, is, and always will be, a difficult problem, and it may safely said, that as a state-wide proposition up to the present time it has not been satisfactorily solved. While encouraging progress has been made there is much to learn about it still. The technique of extinguishing fires and other problems incident to their suppression need be studied by critical analysis of many individual suppression operations before our knowledge will suffice. Knowledge of the effect of weather conditions, types of forest litter, etc. are necessary but are not the principal factors of control. The one thing that is absolutely necessary is an intensive and efficient fire fighting organization. The problem of a fire control organization differs from most other organization problems. It faces difficulties which to a large extent are peculiar to itself alone. Because the work of extinction is intermittent and yet demands unusual effort and often sustained activity day and night for long periods under hard conditions and at a low wage an unusual degree of loyalty and enthusiasm is required. For this reason a fire organization must have and hold a high standard of morale and a strong esprit de corps to be effective, and this in spite of the fact the personnel is ordinarily widely separated and can but seldom be brought together. The necessity for establishing a definite responsibility of the individual for his work and for building up the morale of the organization should never be out of mind and the whole machinery of the organization should work toward this end.

The detail of preventive work should be carried on by the individuals responsible for extinction—arranged so that the official who does it, gets the direct benefits in his own sphere of responsibility. The enforcement of law and the collection of penalities for its infringement, the local public relationship, the education of the local inhabitants should be the work of the man who is responsible for local fire suppression. Posters, signs, talks at schools and other meetings should be handled in accordance with his local problems. The regulation of railroad and other hazards of slash disposal, and fire lines, etc. should be under his supervision. He should have control and full responsibility in a definite area.

Where state-wide control is undertaken there should be recognized the two distinct functions, one of operation and one of administration, and the organization must of necessity be subdivided into units with them in mind. For clearness and convience in discussing organization let us refer to the former as the tactical unit and to the latter as the administrative unit.

The first object of the organization being to put fires out, it should be kept in mind in dividing a territory into units and for this reason the tactical requirements from the suppression standpoint, regardless of political boundaries or other established lines of division should be considered first and the territory organized on this basis. This tactical unit should be set up only after the most careful study of the topography and fire hazards. The territory should be a separate unit from a fire standpoint, surrounded by natural or artificial fire breaks, such as streams, ridges, clearings, roads, etc. so that it is not subject to invasion because of a fire hazard maintained or allowed outside its boundaries. It should contain only the territory which one man can supervise effectually, say from 75 to 100 thousand acres. This tactical unit should be under the absolute control of one man responsible for all fire matters within its borders, both for extinction and prevention. His organization should be complete in itself, and competent in itself, except in cases of extreme emergency. He should have under his control sufficient deputies or local wardens, perhaps 10 to 15, each of whom should have a gang of from 10 to 15 firefighters, men who are available for this duty and who know the work. Dependence can not be placed upon men picked up haphazardly or at random when a fire occurs.

The head of the tactical unit should carefully work out a plan of action for his organization, listing all available resources of men and tools, the means of transportation and the system of liason or routes of communication. His organization should not stop at this, however, but should by education and the necessary missionary work obtain and organize the aid of all of the local inhabitants so that they will give warning in case of fire and aid in all kinds of prevention work. The results of his work should be placed on a competitive basis with that of other similar tactical units. He should be encouraged to think of these results as his own and those of his men.

These tactical units should be grouped into administrative units for the purpose of inspection and supervision and in cases of extreme emergency for tactical purposes. As far as possible the administrative unit should contain only territory which has generally the same cover type, the same topography and, so far as may be, the same hazards of operation and population. The head of this administrative unit should be a man of tried experience who will be able to guide and advise the heads of the tactical units, to supervise and inspect and keep in close touch with them and with the conditions in their units. Under him should also come the lookout system which should cooperate with but not be under the control of the tactical unit heads.

These administrative units should be grouped under one State head—an official from the State Forestry Bureau responsible for this work and this work alone. He should have general supervision and control of the whole State forest fire organization, determine its policies and standards and plan for its future. He should have one or more assistants whose work may be classified into the following;—clerical, as handling records, correspondence, pay and supplies; intelligence, as compiling of statistics, study and analyzation of reports, information and research; inspection, as checking up on reports, conditions and personnel.

The records and reports of the organization should contain sufficient information for worthwhile study. Fire reports should contain not only data as to loss, acreage, forest type, but also give data and information enough to make possible a critique of the tactics and technique employed in the operation of extinction.

Routine reports from tactical units should not only give the activities in regard to extinction but all other activities as well. At least annually all this information should be grouped in a tactical unit plan, by the head of that unit, making an analysis of the past years work, checking up its weaknesses and giving a plan of action correcting these for the coming year.

In general the organization should operate on the well established principle of any progressive organization—Conception or Plan—Transmission of Idea—Operation—Report of Operation—Revision of Plan, etc., around the circle.

The basis for any State control organization of course must be a State Law. This law should not be too radical, but from the nature of the problem itself, it must necessarily touch the delicate question of State control over private property. However, to be effective it should contain provisions for controlling the use of fire, such as fire permits, for the removal of hazards, for penalties for starting forest fire (with or without intent) and should give the officers of the forest fire service ample power to administer the law with the fewest possible technical handicaps and by the simplest procedure. In preparing these control laws the framer should base them, as far as possible, on a well thought out plan, considering not only the immediate pressing need but in full contemplation of the highly organized well controlled organization.

Much publicity in the past has been given over to the appeal to be "Careful," to the legal responsibility of starting fires, and also to the economic loss from fires. While the loss is of course the fundamental reason for fire control and can not be neglected in publicity, it has not a very strong appeal of local application. Also the appeal against this carelessness and of his legal responsibility is very far from being a strong one to the average American. There is another appeal which is fundamentally strong when applied to American psychology. It is the romantic appeal,—that made by the Northwest Mounted Police—the Texas Rangers—the Veterans of our wars—is typical of what is meant. By making publicity play up the hardships, the loyalty, the devotion to duty of the man in the field, of the man who fights the fires, of "the man behind the gun," the appeal made is a tried out, never failing one to the average American. With his belief in the fire service, will of necessity come the thought of the lighted match, the smoldering campfire and the necessity of care with fire in the woods. This appeal also reacts to the benefit of the efficiency and morale of the fire organization itself.

SOME ASPECTS OF STATE FORESTRY WORK IN THE SOUTH

CHAPIN JONES, *State Forester of Virginia*

It seems to me that any discussion of the question of forestry in the South should be based on a clear recognition of the fact that the South is naturally a wooded country. Nature made the South a wooded country, is doing her best to keep it wooded, and will keep it wooded if we give her any kind of a chance. We can all have much more prosperous and happy lives if we recognize this fact and make our plans for our business and industrial development accordingly. We will be working with the grain instead of against the grain, so to speak, or swimming with the current instead of against the current, if we let Nature re-forest the South, and develop to the utmost the business of growing, harvesting and marketing timber crops, or in other words the business of forestry.

A few misguided individuals have expressed a fear that there was some sort of a conflict between forestry and agriculture, or at least that nearly all of the land in the South should be farmed, but the facts do not warrant any such idea. There is plenty of land for both agriculture and forestry. As a matter of fact the amount of land actually used for farming has been steadily declining since the census of 1900 in Virginia and in the South as a whole. Our farmers have been finding for many years that it paid them best to cease attempting to cultivate their poorer and steeper land,

and since the agricultural depression of 1920 have even begun to abandon entire farms. In doing so they are only obeying the law of supply and demand, and no doubt they will continue to do so until they can either get more for what they have to sell or pay less for what they have to buy. At the time of the 1920 census less than 37 per cent of the land area of Virginia was actually farmed, and only a little more was taken up by villages, roads, etc. All the balance is actual or potential forest land, and for an indefinite period in the future will either be used for timber production or not be used at all. If this very large part of the total area of the South is rightly managed it will be permanent revenue-producing property, yielding lumber and other wood products, water, game, recreation and beauty. If not it will be worthless waste and a liability instead of an asset. It is the function of the forestry departments of the different states to try to get the forest lands and "waste" or "brush" lands managed so that they will yield these benefits.

While the situation is not exactly the same in any two of the Southern States, I believe that by this time there has been sufficient experience to bring about a rather general agreement as to the principal lines along which the State Forestry Departments should work. The following brief description of the activities of a State Forestry Department is based upon the work of the Virginia Department, and is in accordance with my opinion as to what is a sound program. Theoretically the first and most fundamental work to be undertaken is investigative work, particularly in the way of a stock-taking or inventory, so to speak, a study, of what the situation is, where the forests are situated, what their nature is, what their condition is, in what ways they are being badly managed and what the reasons are for this bad management. Most Forestry Departments recognize such a study, which should be state-wide and very thorough, as a fundamental and primary necessity, but actually we cannot undertake it on any proper scale, because of the fact that all Forestry Departments start with very meagre appropriations and for practical reasons we are obliged to plunge at once into the other activities, principally fire protection. Although the Forestry Department in Virginia has been in existence for nearly 11 years we have never had the funds to make it even remotely possible for us to undertake a state-wide study of what our forest resources consist of. We have made a number of fragmentary studies, usually on a county basis, which have been useful locally, but they do not give us the information that we need for the State as a whole.

The investigative work toward the solution of forestry problems is exactly the same in theory as the work of the agricultural experiment stations toward the solution of agricultural problems. A much larger staff of investigators is needed in order to make the investigations in forestry comparable to those in agriculture in extent and in the value of their results. There is no conflict or duplication between the investigation work that the State Forestry Department should do and that of the Appalachian and the Southern Forest Experiment Stations under the direction of the U. S. Forest Service. Each has its own proper field.

A special sort of investigative work that is very greatly needed is a study of the effect of present systems of taxation, to be followed by the recommendation of a better system. It has been widely believed for many years that the method of taxing forests which obtains in most States, namely an ad valorem tax on real estate, is not adapted to the taxation of forests, in fact it is now often held that such a tax is ruinous and makes the practice of forestry impossible. This view has resulted in special ways of taxing forests in a number of States, but I am of the opinion that the best solution of this problem has not been reached in any of the States. I know that satisfaction with the new laws has been expressed in a number of States, but I believe that such expressions are based on inadequate information and experience and that the answer to the problem of how to tax forests has not been found. The U. S. Forest Service, in accordance with the requirements of the Clarke-McNary Act, is instituting a far-reaching study of this problem, under the direction of Prof. Fairchild, of the Department of Economics at Yale University, who has been one of the foremost students of this problem in the United States for many years.

The second fundamental necessity is popular education in forestry. As a result of the long period during which our forests had to be destroyed to make way for farms, and during which lumber and other forest products sold for so little that it did not seem worth while to attempt to raise them, our population got into the habit of thinking of forests as something which did not need to be renewed or which could not profitably be renewed. This attitutde of mind has persisted into the present time, in spite of the fact that the situation is fundamentally changed. While the area of forest land is increasing, the sale values of forest products of good grade are also increasing, because of scarcity, due to the depletion of the supply of standing timber of large size and good quality. But old ideas die hard. Only a small fraction of the people are up-to-date insofar as their attitude toward the management of forests is concerned. The backwardness of the great majority of our population in this respect is retarding progress, and it must be overcome by educational measures on a scale which it has never been possible to attempt heretofore. The response to educational work in forestry on the very small scale on which the Southern Forestry Departments are able to conduct such campaigns is very gratifying, and the prospects for improvement along this line are excellent.

It is also very important for the State Forestry Departments to have a staff of foresters who can examine privately-owned lands and advise the owners as to how to apply the principles of forestry to their particular problems. By far the greater part of the forest land and waste land in the South will be privately owned for many years and the productive management of this land can be greatly stimulated by direct assistance to the owners on the part of the State. I believe that the next step that each of the Southern Forestry Departments should take along this line is the employment of at least one forester to devote his entire time to studying the problems of the marketing of forest products and assisting forest land owners to market to the best advantage. I believe marketing is at least as important a part of the forestry problem as it is of the agricultural problem, perhaps more so, because of the necessity of technical knowledge of the qualities of wood.

I believe that each of the Southern Forestry Departments should also establish a nursery for raising forest trees for distribution to land owners in the State for reforestation, although such nurseries will probably be conducted on a small scale for some years. I do not mean to imply that our cut-over and waste areas are going to be artificially replanted on any tremendous scale. Natural reproduction is so much cheaper than artificial that we should count on it by all means for the great bulk of our reforestation. But, in spite of this, it is true that there are considerable areas, particularly where virgin timber has been cut over in recent years and repeated fires have occurred since, where suitable trees large enough to scatter seeds are very few and far apart. Such areas will not reforest themselves naturally for many years, and they should be planted at once.

Besides this there are large areas of badly gullied fields which can best be reclaimed by the planting of trees in them. These trees can most advantageously be grown by State Forestry Departments and sold to landowners at a cost low enough to encourage reforestation. Since July 1, 1925, federal co-operation is available to the State Forestry Departments in the raising of forest trees, and Virginia has just taken advantage of it, although on a very small scale.

The forestry laws of Virginia provide for the purchase of State Forests and for their management "so as to demonstrate the practical utility of timber culture and as a breeding place for game." No appropriations have yet been made in Virginia for the purchase of State Forests, but one such property, consisting of about 800 acres, has come to the State as a gift.

I believe that insofar as the steep lands at the headwaters of streams are concerned, the state must purchase such lands in its own interest, for are concerned, the State must purchase such lands in its own interest, for sion, since it is doubtful if in such unfavorable situations private owners will ever find it to their interest to go to the expense of keeping such lands under an adequate forest cover. The National Forests solve this problem insofar as the land actually in Federal ownership within the National Forest is concerned, but it is not intended that the National Forests should ever cover anything except the very largest compact bodies of land that would otherwise probably remain unproductive.

I believe that the State should also own smaller properties in the more level sections of the State as demonstrations of the proper handling of forests, and some way should be found whereby the State can finance the purchase of State Forests, as soon as possible.

However important the foregoing activities may be, the organization of a forest-fire protective system is the work that takes most of time and money of the State Forestry Departments in the South at the present time, because it is fundamental. A reasonable degree of protection against fire is the first step in the productive management of forests. In common with all other naturally wooded States. Virginia is subject to recurring periods of great danger and suffers very heavy losses from fire. The best available estimates, based on necessarily hasty and incomplete reports from the forest wardens in the counties where there are such officers, indicate that on the average the actual tangible money loss to standing timber and buildings, fences, etc., amounts to between one-fourth and three-fourths of a million dollars per year. But this represents only a small fraction of the real loss, since the fires destroy principally the young trees which should develop into the forests of the future. Hence the real measure of the loss occasioned by forest fires is the potential value of the forests which are kept from developing to their full size by the destruction of the trees that are just getting started. There is no way of estimating in dollars and cents the injury to the soil, to the stream flow, to wild life and to scenic beauty, which are immensely greater than the direct tangible damage.

The organization of a protective system requires judgment and experience, but in a general way the necessary method of organization has been learned by experience. The principal problem remaining is the all important one of how to secure the necessary funds. These funds should come from the Federal government, the State government, the counties and the land owners. Col. Greeley has said that in a general way the Federal government should bear one-fourth, the State government one-fourth and the landowners one-half. I think there is general agreement that such a division would be fair and workable, but in Virginia at least, and no doubt in other Southern States, the counties are political units of such importance that it is both possible and advisable to secure their participation, which reduces the amount that must be required of the landowners. Funds with which to extend our present protective system to the whole State and with which to intensify the work and make it more effective where it already exists are urgently needed, and bills designed to increase the participation of the counties and the large land-owners in the protective plan are being worked out. Whether the Legislature will pass any such bills, and whether it will make available more nearly adequate appropriations, depends on the extent to which the well-informed citizens make their influence felt. Our goal is state-wide forest fire protection in each state throughout the South.

FORESTRY IN ALABAMA

PAGE S. BUNKER, *State Forester*

The landowners of Alabama view forestry as a specialized field of profitable economic production, and conceive that timber growing is fundamentally a function and responsibility of the owner of the land regardless of whether the title is vested in an individual, a corporation or the public.

This view of forestry has obtained for many decades in our State, and we have various timber growing projects involving considerable areas that have been in profitable operation for some 60 or 70 years. At the present time there are over 300,000 acres of forest land within the State, exclusive of public forests, definitely devoted to timber growing and so managed that there has been a greater continuous and profitable production of forest values than would have accrued without such management. Additional forestry projects are being initiated in various parts of the State.

One of the deterrent factors affecting timber growing—that of improper taxation of the immature stand—has been largely obviated by certain provisions of the Forestry Act of 1923. Under this law timber on lands placed under contract with the State for forestry purposes is not taxed during the period of the contract, all taxes on the timber being deferred until it is removed or the contract terminated, when it pays a flat 10 per cent yield tax.

The Act of 1923 also initiated State work in forestry through the establishment of a nonpolitical Commission of Forestry. The policy of the Commission has been toward stimulating initiative in timber growing on the part of the landowner. In general, we have not conceived that it is necessary or desirable to relieve the owner of responsibility toward his forest property through government ownership of this source of production. While State Forests undoubtedly will be established for obvious and adequate reasons, we have not yet placed special stress upon this development.

In scientific and technical fields the State Commission of Forestry cooperates with all classes of owners. Advice and assistance are furnished upon request in connection with forestry problems, whether they pertain to a single tree or to a tract of several thousand acres. Special attention, however, is given to the owners of small tracts. The character of the assistance rendered varies from advice in shade tree repair to a complete working plan for a large forest area.

In Alabama, as in most other parts of the country, the basis of all forestry is fire protection. In this branch the Commission of Forestry serves as a coordinating agency for private efforts and also supplements such endeavors through a system of forestry districts each patrolled by a State Forest Ranger. This system was initiated during the fall of 1924 and by the close of the year about 4 million acres were included in districts. While the very high fire hazard of that year resulted in more than the average extent of burning in the unorganized territory, the burning within the forestry districts was sufficiently less to bring the total for the State somewhat below the previous average. Similar results obtained during 1925, the area included in districts having been increased to about 6 million acres.

In fire protection, as in the other branches of forestry our chief efforts have been toward arousing to action the landowner himself. A fairly intensive informational, campaign has been carried on through all available channels. We have designedly omitted the patronizing, accusatory and satiric elements that often defeat the objects of so-called educational work, and have endeavored to follow, instead, the established principles of public relations.

The results of these efforts have been reflected to a very great extent in volunteer assistance to the rangers in fire fighting. The State does not offer employment contingent upon the occurrence of forest fires. Chief dependence is placed upon community sentiment to furnish aid in case of need. In 1924 within the forestry districts over 1400 volunteers worked on fires without pay from the State. Complete figures for 1925 are not yet available, but at last accounts about 4900 volunteers had served within the 6 million acres included in the organized territory.

FORESTRY IN ARKANSAS

Dr. A. C. MILLAR, *Secretary, Arkansas Forestry Commission*

In the summer of 1924, Governor Thomas C. McRae, who was serving in Congress when the National Forestry Policy was inaugurated and who is intensely interested in the problem, appointed an Honorary Forestry Commission of thirty-three, including many leading lumbermen, and other prominent citizens, and requested them to study the question and prepare a measure for the consideration of the next Legislature. A small fund was raised and I was elected secretary and began to visit and study the forests in different parts of the State and to confer with those who understood the problems.

The Commission in the fall drew a simple bill for the organization of a Forestry Commission, seeking to make it easily understood and omitting any radical features. It was introduced in the Senate by its President, Hon. Robert Bailey, and without much delay was passed. In the House it encountered delay and opposition, and those who were opposed created much prejudice; hence, when it came up near the end of the session, it was defeated. Governor Tom J. Terrell, who had succeeded Governor McRae, was friendly to the bill, but having his own program to put through, was not able to use his influence as we had hoped he might.

We are not discouraged by this defeat, because we know that in practically all States, until the subject is thoroughly understood, it is difficult to get legislation. Mr. J. R. Hamlen, Chairman of our Honorary Commission, after conferring with the other members of the Commission, decided that we should maintain the Commission in order to carry on the educational work necessary to popularize our measure. Our funds are very meagre, but I was instructed to keep the question before the people by writing and speaking, and particularly by getting the question before the schools. Consequently, we are preparing to promote essay writing for prizes in all of the schools.

In the rural schools the children are asked to write on, "What The Forests Mean to the Farmer." They will be instructed to find out what it would cost the farmer if he had to buy his fuel and fencing, to report on what forests are in their school district, and what mills, also to learn what the annual growth of an acre of local trees is worth and the value of the leaves for soil enrichment. These essays are to be read in the schools and the best published in the county papers and prizes awarded by merchants and bankers.

In the high schools the students will be asked to write on, "The Timber Resources of My County." They will be expected to find out how much timber is in each county, the various lumber industries, and their value to the county, and how long they may be expected to run, and what will be the effect on county revenues and incomes when the lumber industry in the county ceases.

The college students of the fifteen colleges will be expected to discuss "A Forestry Policy for the State," and a prize will be offered for the best essay in each college, and for the best of these prize-winning essays.

In all cases, local interest will be aroused by getting local people to offer prizes, and the essays will be read and published in local and State papers.

Our Governor is very much interested and promises to help our cause in every way possible, and we are hoping that the members of the next Legislature will be sufficiently informed to adopt a fair law for the organization of a Forestry Department.

It does not need to cost much. The principal object would be to secure means for fire-prevention. While a State Forester would be expected to lead, still his chief work would be to get the people to cooperate in preventing fires and in promoting the growth of trees as a crop. As the supply of hardwood must come largely from small bodies of timber, we hope to arouse the farmers to the value of woodlots as sources of perpetual revenue, and thus to provide for a considerable growth of hardwood in the northern and western sections of the State. In the eastern part of the State, the rich lands are being drained, and their value is such that it will be practically impossible to preserve any large bodies for future use. The best that may be hoped in that section is to promote the planting of certain trees where the lands are not valuable or are overflowed, and thus to provide fuel and lumber for local use.

In the southern and southwestern sections, a few large lumber companies have begun scientific forestry and have sufficiently large bodies of virgin timber to run until their new growth begins to yield returns. It is believed that these companies will be able to run indefinitely.

As practically half of the area of the State is not first-class agricultural land and as there is little demand for more farms, except in the bottoms and orchard sections, it is believed that the policy of the State should be to encourage practical forestry and perpetuate the lumber industry through which 67 per cent of all wages are now paid. With the development of hydro-electric power there will be opportunity to establish many wood-working industries, and the supply of different kinds of wood must be maintained to foster these worth-while enterprises. As I have traveled over the State during the past year with my eyes open to the situation, I discover that in many places where the lands were cut over thirty years ago, there are valuable forests, and they are being cut by small mills, and in some places for wood pulp.

If we can get our farmers interested in preserving trees and thinking of them as a crop and our big mill owners to re-forest our cut-over lands, we can have a perpetual supply. If this is not done, in thirty more years, our large forests will have perished and half of our area will be almost worthless. That will be a calamity, and will result in the depopulation of certain sections and the reduction of tax revenue to the point where schools can not be maintained and where even county government will hardly have sufficient revenue for existence.

We are not seeking to secure tax-exemption for cut-over lands, because the best lawyers say that under our Constitution it cannot be done. Then, if the right kind of public opinion can be created, that question will take care of itself at the proper time without injury to any class or interest.

Since ours is one of the great timber-producing States, and the lumber industry is the greatest industry in the State, and lumber is increasingly in demand at higher and higher prices, it is of vital importance that our people shall understand this problem and settle it right. We believe that by the process of public education, we can secure the correct solution and we are determined to continue agitating and educating until we get what we ought to have.

FORESTRY IN FLORIDA

W. L'E. BARNETT, *President, Florida Forestry Association*

Florida still has about 16,000,000 acres remaining of the original forested area of 28,800,000 acres. Of the 7,500,000 acres of cut-over land, 5,300,000 acres are idle and not restocking. The present timber stand is about 30,000,000,000 feet.

The estimated lumber production of Florida for 1925 was one billion two hundred and fifty million board feet. The lumber consumption was approximately 1,500,000,000 feet. This year's consumption will undoubtedly exceed that of last year's. The fir manufacturers on the Pacific Coast are already planning to ship large quantities of that wood to Florida this year. In the last year Florida ceased to be an exporting state and will probably never produce as much lumber as it will consume for many years to come.

During the year 1925 the State of Florida produced 32 per cent of the total production of naval stores of the United States. However, the present production of young pines is less than two million acres or one-fourth of the acreage needed to maintain the present production of naval stores.

Over 30 per cent of all the wage earners of the State are in the lumber industry and twenty per cent are employed in making naval stores thus making a total of 50 per cent of all the wage earners of the State in these two industries combined.

There are 338,000 acres of National Forests in Florida but there are no State Forests, there is no Forestry Department and there is only an inadequate law to control the setting of fires which is so little observed that it is practically a dead letter.

Forestry bills have been introduced in the Legislature in 1921, 1923, and 1925 but have always been defeated. The opposition has come principally from the range cattlemen who are strongly organized. Neither the lumbermen or the naval stores operators have given these measures the support that was expected of them and it is to be hoped that the forestry bill that will be introduced in the 1927 Legislature will have their endorsement and support. The forestry bill which will be introduced in the

1927 Legislature will be essentially the same as the Alabama law. A prominent naval stores operator in the State, a former supervisor in the U. S. Forest Service, is responsible for the section of the bill which insures the counties containing forest land adequate funds to carry on their local government.

With probably ninety per cent of the people of Florida in favor of a forestry law, proper organization and effort should succeed in giving the State next year the forestry law it needs.

FORESTRY IN LOUISIANA

W. R. HINE *Superintendent, Division of Forestry*

The Louisiana Division of Forestry is charged with the development of the practice of forestry on the 15,500,000 acres of forest land within the State. This amounts to something over one-half of the total land area of Louisiana. In order that these millions of acres of forest land may be maintained productive the Legislature has appropriated $60,000 annually, and in addition there is allotted by the Federal Government $28, 820, making a total of $88,820. The State appropriation does not come from the usual tax channels but is a part of the general severance tax and is paid by the lumbermen on their forest products.

The Division of Forestry is a part of the Department of Conservation of the State of Louisiana and is, therefore, under the direction of the Commissioner, the Honorable V. K. Irion. Its policies and plans are determined by the General Forestry Advisory Board, composed of two forest land owners, one farm land owner and the head of the State Forestry School. This Board is appointed by the Governor, meets quarterly and employs and directs the work of the Superintendent of Forestry.

The organization is headed by the Superintendent of Forestry who is responsible for all forestry work within the State. He is primarily in charge of forest fire protection, the development of better methods of forestry practice with the larger land owners and the placing of lands under reforestation contracts. An assistant Superintendent of Forestry is responsible for education and publicity, the development of the State Forest and State Nursery. It is planned in the near future to have a third assistant who will be primarily an educational man working out of Baton Rouge in cooperation with the General Agricultural Extension Agents. His job will be to educate the farmers of the State to the benefits to be derived from the practice of forestry. In addition there is a permanent force of 25 year-long men and 100 part-time fire patrolmen.

The State has been divided into eight districts, each district in charge of a district ranger. The rangers are assisted by parish wardens who have charge of the work in individual parishes. The parish wardens in turn have supervision over the cooperative fire patrolmen who are each in charge of about 15,000 to 20,000 acres.

The efforts of the Division of Forestry for the next few years will be concentrated on fire protection, better methods of managing forest lands, development of State Forests, distribution of forest planting stock and contracting of lands for reforestation purposes. In each phase of the work it is remembered that education is the most important means of accomplishing results. Educational work will be statewide in scope.

Fire prevention is considered the most important task for the next few years. Louisiana's loss to timber and young growth during 1924 is conservatively estimated at 5,000,000 dollars. With fire protection, most of the forest lands of Louisiana will reseed naturally and will produce a partial crop of timber without further aid from forester or owner, though of course, intelligent forest management can very materially increase the total yield.

The present funds do not permit us to attempt to protect the entire state from fire. It would require four or five times the present appropriation to do a thorough job. It is, therefore, planned to start with small centers where the forest land owners are already attempting to protect their land, the plan being to help them who are helping themselves. On these selected areas the cooperating land owner contributes toward the employment of fire patrolmen. The State employs these men, contributing half of their salary, and is responsible to the land owner for the results obtained. At the present time about 1,500,000 acres are under cooperative fire protection. It is hoped that as the benefits of this work become apparent the work will gradually extend to the lands around until finally the entire State will be under protection. Along with this we are making a complete land classification of the forest lands in the State that will give us the basis for the future policy of the Division of Forestry in all of its work but particularly in its fire protection efforts. Morever, the basis is being laid for fire towers and telephone lines that will cover the entire State.

Through its field organization, the State is influencing the owners of virgin timber land to cut it in such a manner that trees are left to restock the area. The Louisiana law is ineffective in its attempt to compel the forest land owner to leave trees but through the educational work of the State employees it is possible to obtain the cooperation of these land owners in leaving seed trees. In the same way the State is encouraging the owners of small timber suitable for pulpwood to thin it or at least to leave enough trees to grow into sawlogs.

Another important feature of the State work will be the development of the State Forests. Immediate plans call for the expansion of our State Forest to perhaps 10,000 acres. This is done because a large unit can be more economically handled and it is necessary to get the prices on the land surrounding the State Forest before it goes up in price as a result of our improvements. With this State Forest developed to its logical limits it is then planned to develop similiar ones in other favorable locations throughout the State. In each of these forests, provision will be made for State Parks in which the more beautiful portions, such as streams, lakes, camp sites, and exceptionally beautiful bodies of timber, will be set aside as State Parks and will be untouched by logging operations. The balance of the forest will be used as demonstration areas to show the possibilities to be obtained from the practice of forestry.

Plans for the State Nursery for the coming year include the growing of 800,000 seedlings. Most of these are pine but there will also be a great many oaks, ash, elm, sycamore, beech and other hardwoods. It is planned to charge merely the cost of production for these seedlings.

The Louisiana law is exceptionally favorable to forest land owners who wish to grow timber. It permits an owner to contract his forest lands with the State for the purpose of growing trees, for a period up to 40 years. When contracted the lands are assessed at the bare land value and remain at this fixed assessment on the tax rolls throughout the life of the contract. When the timber is cut he pays the usual 2 per cent severance tax. The fixed assessment tax permits him to grow timber without the increase in assessment that usually comes with increase in value. Something over 200,000 acres have been contracted to date. The owners include farmers as well as large corporations. Each of these owners is definitely committed to the practice of forestry and will serve as nuclei around which better forestry will develop. The law is not altogether satisfactory at the present time and it is probable that the next legislature will take steps to make it as nearly perfect as our present knowledge will permit.

FORESTRY IN MARYLAND

F. W. BESLEY, *State Forester*

The objective of the Forestry Department in Maryland, as in other States, is to secure the universal practice of forestry on all of the forest lands in the State. This cannot be brought about by direct means, since the amount of state-owned land is practically negligible, (we have less than 5,000 acres of State Forests) so that whatever is done in promoting forestry must be with the cooperation and assistance of private owners.

When the Forestry Department was established nearly 20 years ago, the very first undertaking was an inventory of the forests of the State, their extent, character, and condition. It took 6 years in which to map all of the forested areas of the State, even down to 5 acre woodlots, but the correct forest maps made and the mass of information collected was well worthwhile, because it gave us not only a detailed, accurate inventory of the forest resources of the State, but a large mass of other information, relating to forest industries and forest uses that has been of incalculable value, and has enabled us to develop a policy designed to meet the particular needs of the State.

Since the main problem was working with the private owners, the important thing was how we might reach the individual. It was largely a matter of education, and that continues to be the main function of State forestry work. Every opportunity was used to prsent the principles and practices of forestry before organizations of all kinds that might be reached. Special studies were made on subjects in which there was a lack of information, and reports were published. Investigations were carried on to determine the best forestry practices. The knowledge of forestry has been spread abroad in the State, until there is scarcely anyone who does not know what it is all about. But with all this, it was found that forestry was not being put in actual practice, anyways commensurate with the opportunities afforded by our exceptional position of nearness to consuming markets, excellent transportation system, and the existence of a great variety of trees of commercial value. Forestry had to be carried to the individual owner in a more tangible way than delivering to him a bulletin on how to improve his forest. Even for a forester to go on the lands of the owner and point out to him on the ground the general method of handling his forests, while infinitely better than preaching to him, failed to bring satisfactory results. To carry out the forester's recommendations often called for an entire change in practice and inauguration of a new system which the owner felt incompetent to carry our or reluctant to undertake. To meet this situation, a plan was worked out whereby the Forestry Department renders personal service to the owner in selecting and marking the trees to be cut, furnishing an estimate of the amount of timber and its value, preparing contracts for timber sales and putting the landowner in touch with timber buyers.

For this service, a charge is made, representing about half of the cost, so it is entirely a cooperative matter between the State and the private owner, and the result has been most satisfactory. The owner realizes that he is getting expert help of practical value, while the State is benefited in having forestry put in practice on scattered areas throughout the State, serving as a demonstration to the community. Next to State owned land, placed under State Forest management, this appears to be the most certain way of bringing about the practice of forestry. During the past 10 years, under the operation of this plan, the Forestry Department has put forestry in practice on approximately 2 per cent of the forest area of the State.

In Maryland, as elsewhere, the damage wrought by forest fires has been most appalling. Without a reasonable control of the fire menace, expenditures for forest improvement are impractical. Since most fires are the result of outside agencies beyond the control of the individual owner, it is distinctively the duty of the State to provide forest protection. The State expenditure for forest protection in Maryland, as compared with the manifest needs, has been extremely small. Of the forest areas of the State, two-thirds is in farm woodland, each with a relatively small acreage, so that a highly organized intensive system, such as is required in heavily timbered sections is not necessary, and the fire danger is not so acute. Notwithstanding this, the forest fire problem is the most serious one that the Forestry Department has to solve. Much has been accomplished in cutting down the annual fire damage and particularly the acreage of forest fires. A system of forest wardens, supervised by district wardens, is in operation. There is also a chain of fire observation towers, covering the more heavily timbered sections of the State.

For the amount of money expended, it is, I believe, generally admitted by the United States Forest Service, that we are getting excellent results. We are not satisfied, however. We estimate the cost of efficient forest protection in Maryland to be about $50,000, annually, while we have available only about one-fifth of that amount. Our annual fire damage is about $125,000. We will not be satisfied until we attain efficiency in this field of activity. The Forestry Department realizes that the work is imperative, that forest protection is prerequisite to the practice of forestry, and this feeling is gaining rapid headway, so that we confidently look forward in the next few years to marked progress in this important branch of forestry work.

The forest survey of the State showed that there was, approximately, 350,000 acres of idle land, producing no crop of value, little taxes, and a heavy liability to the owners. Most of this land is suitable not only for timber growing, but is better adapted for that purpose than any other, but most of it will not be reforested except by planting.

To take care of this situation, as well as to furnish forest planting stock for other purposes, the State Forestry Department in 1914 established a Forest Nursery for growing planting stock to be distributed at cost. This project has been popular from the first,—the applications for stock always exceeding the supply, although the capacity of the Nursery has been increased by three additions since its establishment. Applications for this spring's planting stock indicate a demand for three times the amount of stock we have available for distribution. Our present capacity of 500,000 seedlings will be doubled in the next two years.

The Forestry Department, under a law enacted in 1914, is charged with the care and protection of all trees within the rights-of-way of the public highways throughout the State. This has extended our activities into the domain of shade trees and opened up a field of wide opportunity. Beautifying our improved highways by tree planting is being advocated. Although comparatively little has been done in the way of actual planting by the State, trees are being grown at the State Forest Nursery and distributed at cost for roadside planting. The present capacity of 5,000 large size trees for roadside planting is entirely inadequate to meet the demands, and will be increased to 7,500 in another year.

There is not only pride in possession, but it gives at least one very good reason for existence. A State without substantial State Forests is tremendously handicapped. With only 5,000 acres of State Forests in Maryland, we feel this most keenly, and our great ambition in the next 10 years is to have 200,000 acres of State Forests. Suitable land is available for the purpose, there is a real interest in the subject, if not a popular demand. We hope to stimulate this interest to the extent of developing a popular demand, prior to the next meeting of the Legislature, one year hence. We believe, also, that the need for State Parks, now so urgent, can be supplied by State Forests to a large extent. Our three State Forest areas, each located about 100 miles apart, are serving also as State Parks. We believe by securing State Forests in the various sections of the State, where beautiful scenery is available that it will meet present needs. Such parts of the State Forests, as are of great scenic value, will be maintained in their natural condition and made accessible by roads and trails for the enjoyment of the public, while other portions will be managed distinctively for timber producing and watershed protection areas. There will, of course, be parks and playgrounds maintained by cities and towns, distinct from the State Forests and serving an entirely different purpose. State Forest acquisition can be greatly promoted by developing the State Park idea and enlisting the support of all people who use the forests for pleasure. This is what is being attempted in Maryland.

State Forests can, also, be promoted by enlisting the support of the game interests. There is no reason why restricted areas within the State Forests should not be set aside as game refuges, such as is being done in Pennsylvania, thereby insuring the restocking of adjacent areas of State Forests with an abundance of game for the licensed hunters. The game interests with their strong game protective associations can be of invaluable help in State Forest acquisition,—an influence that should not be overlooked.

In States where National Forests have been established, it will be increasingly difficult to secure State Forests. Land in the Eastern States that is suitable for National Forests is just as suitable, if not more so, for State Forests. Since, I presume, every State Department would like to have extensive State Forests to give it stability and something with which to work, there must be, inevitably, a conflict of interest in any State where both the Federal Government and the State are seeking to establish publicly owned forests. Speaking for the Maryland Forestry Department, we feel that the acquisition of National Forests would seriously interfere with our State forestry program.

The Forestry Department in Maryland is seeking to supply every form of service that can be reasonably expected of it. We are going still further in trying to develop new activities that will benefit the timber owners and timber users. Our work is constantly growing—new contacts are being made and forestry is making progress.

FORESTRY IN OKLAHOMA

GEO. R. PHILLIPS, *Secretary, Forestry Commission*

The last session of the Oklahoma Legislature created a Forestry Commission empowered to employ as its secretary a trained Forester.

No definite fixed policy for Oklahoma has yet been outlined by the Commission, but in general it will undoubtedly consist principally of fire protection for the existing forests in the eastern and southern parts of the State and a program of wind-break and woodlot planting on the farms in those sections of the State where trees can be successfully grown.

It is planned to establish a nursery on the grounds of the A. and M. College at Stillwater, from which seedlings will be available.

Further than this, I do not care to enlarge until more definite policies have been adapted.

FORESTRY IN NORTH CAROLINA

J. S. HOLMES, *State Forester*

The State Forestry work in North Carolina is now centered in the Department of Conservation and Development, which was created by the General Assembly of 1925 to take over and enlarge the work of the old Geological and Economic Survey. Last month the Governor appointed as Director of this Department Major Wade H. Phillips of Lexington, N. C., who is a special representative of Governor McLean at this Congress. At the same time he appointed the Board of Conservation and Development as follows: S. Wade Marr, Banker and President of the Rotary Club; Raleigh, N. C.; John H. Small, Office 430 So. Bldg., Washington, D. C., (residence, Washington, N. C.), H. L. McClaren, President. Made-in-Carolinas Exposition, Charlotte, N. C.; James S. K. McClure, Jr., Mgr., Western N. C. Farmers' Federation, Asheville, N. C.; H. B. Shaw, Dean, School of Engineering, State College, Raleigh, N. C.; Dr. D. D. Carroll, Dean, School of Commerce, University of North Carolina, Chapel Hill, N. C. The Governor is Chairman ex-officio of this Board.

The Forestry Division of this Department, in charge of the State Forester, has for the past ten years devoted most of its funds and energies to forest fire protection. The area annually burned over is being gradually but slowly reduced, in spite of the figures for 1924 which showed

326,000 acres burned over with a total damage of 1,420,000 dollars. The figures for 1925 are not yet available.

State appropriations to support this work have been very small so that financial cooperation from the counties in which protection is planned has been required and some $10,000 annually is now being secured from the 29 counties which are cooperating. The Federal Government has accepted this as part of the State's expenditure for fire prevention and has very liberally recognized the joint funds as coming under the Clarke-McNary law.

While an increase of funds for this work is essential, it is almost equally essential to put the work on a less uncertain basis. As long as the counties can take up or drop this cooperative work at the will of the Board of County Commissioners, so long will the work done in the counties remain ineffective. This work is different from most cooperative work, for instead of being able to renew cooperation and supervision where the work was left off, a period without protection will put the work back, often further than before protection was originally started. The cooperation of counties must therefore be stabilized by making cooperation obligatory.

Again the project is greatly handicapped by having to retain a considerable contingent fund for exceptional fire seasons, and where such contingent fund has to be returned to the treasury at the end of the fiscal year if unexpended a real handicap is placed upon the effectiveness of the organization. An effort will be made at the next legislature to in some way remove these two very serious handicaps to the work.

The present organization consists of a county forest warden in each county where protection is being carried on. Under him are a number of district forest wardens who are in turn each assisted by several deputy forest wardens. These are all part-time men, paid by the hour for the time actually expended. The work is now included in four districts containing from 4 to 10 counties which are cooperating and as many. or more, that are not cooperating. Each district is in charge of a District Forester, a full-time technically trained and experienced man who has his office centrally located in his district. The whole organization is under the immediate charge of an Assistant State Forester of exceptional experience.

Last year through the offer of the Federal Government to cooperate with this State under section 4 of the Clarke-McNary law a small State Forest Nursery was started in cooperation with the State College and in charge of an Assistant Forester who is a technically trained man. It is planned to grow forest seedlings for distribution to the farmers of the State at approximately cost price. This work will be extended as soon as possible so that the larger landowners can also be helped by the offer of planting stock at a reasonal price. Through the cooperative agreement with the State College the Assistant Forester in charge of nursery work has also started an elementary forestry course for agricultural students at the College. It is expected that this will develop into a permanent and required course.

The administration of the State Parks and State Lakes has also been placed in charge of the State Forest Service. In addition Mt. Mitchell State Park, part of which is covered with a remnant of the southern spruce and balsam forest. Fort Macon State Park of about 400 acres on the coast, has recently been established through Act of Congress and the State Legislature. A third park of about 100 acres to be named Rendevous Mountain Park has just been offered as a gift by a private party; and this will be put under administration as soon as possible. Several large lakes in the Coastal Plain region are owned by the State but no land is held in connection with them. It will be the object of this Department to secure sufficient land on the shore of each of the lakes to guarantee, for all time, proper access to the water by the public. It is the hope that such lands can be secured by gift but if not the Legislature will be requested to make suitable appropriations for this purpose.

There are now three State agencies offering assistance to the private woodland owners. The State Forest Service in the Department of Conservation and Development offers fire protection in cooperation with counties or landowners or both. It advises with large timberland owners or lumbermen and suggests better plans of management. It secures and publishes statistics and makes studies of the various State industries and problems connected with the forest resources. The Agricultural Extension Service with the State College of Agriculture and Engineering employs a forestry specialist to carry on demonstration work in thinning and other phases of forest management with farmers and other small land owners. The State Department of Agriculture maintains a forester whose chief duty is to assist farmers in the marketing of their woodland products. All three agencies cooperate in the forestry work and all three carry on educational and publicity work as the chief means of getting all the people interested in forestry.

FORESTRY INSOUTH CAROLINA

HENRY H. TRYON, *Extension Forester*

'After hearing these wonderful progress reports from Foresters in other states. particularly in the North, a summary of the situation in South Carolina will seem like going back into the Dark Ages."

There is no need to detail our past, you all know that we have a total area of nearly 20 million acres, 17 million of which was once forested. Today we have left, perhaps, half million acres of old growth yellow pine.

The last land census gives South Carolina between 10 and 12 million acres of forest land—something better than half of our total area. Of course, we have today a great deal of cleared land. But we know that much of this land which is being farmed is non-agricultural and should be growing timber.

The usual operating practice has been to cut clean. Few seed trees have been left—and these usually by accident. As a consequence we have vast acreages of cut-over land restocking only to Turkey and Blackjack Oak. Such lands produce nothing save a little fuel. They earn virtually no income, and they cost the owner annually for taxes. So our great problem is to put these idle forest lands to work.

In solving this we have two great obstacles. Our fire situation is deplorable; and uor tax situation is ludicrous. Since the Civil War, it has been the custom to burn off the woods every spring. Various reasons are given for this—fire "greens-up" the range for the cattle; it kills boll weevils; it kills snakes and varmints. All these arguments are fallacies. But it is an old custom and it will take time to root it out.

As to taxes we have the familiar ad valorem tax on both land and timber coupled with a so-called "Timber License Tax" which fails to function in many cases. So, we lack one of the great incentives to produce timber and any reproduction that starts is apt to be fire-killed.

In my work I am stressing four main points:

Fire Prevention.

Proper Taxation of Timber.

A State Forest Service.

(South Carolina has no State Forester).

The leaving of seed trees and the cutting to a higher diameter limit than is now practiced.

In carrying this out, Iuse correspondence, the press, personal visits, illustrated lectures and demonstrations. There has been a perceptible infiltration of the idea, but chiefly among the progressive element. It is difficult to reach the illiterate whites and negroes.

They can not read the papers and they are ignorant and suspicious of new ideas. So with these strata of the population, we are working mainly with their children through the schools.

FORESTRY IN TENNESSEE

R. S. MADDOX, *State Forester*

State Forestry work in Tennessee was begun September 1st, 1914 with reclamation of waste land as the leading feature at that time, but with as much publicity for forestry in general as opportunity would permit. Reclaiming such areas by tree growth creates forest appreciation and prevents, thereby, other forested areas from being uselessly and wastefully cleared to supply the need of more land for cultivation.

In 1921, State Forestry was made into a Bureau by an Act of the Legislature, and an appropriation secured for a start upon forest fire prevention work through the creation of a technical and field force for that purpose. Two technical men were secured to assist in the organization of the field force, but the policy was adopted of not paying volunteer fire fighters; the field force consisting of men selected and appointed by the State Forester, receive pay for their services during stated seasons, in helping conduct the work in the forested areas, but beyond this the citizens were depended upon to contribute their aid to the cause free of charge. Influential citizens were sought for appointment in this work, both to fight fires and to create sentiment against setting fire and to secure through their influence volunteer aid in fire suppression. In addition to this, reclamation work was expanded.

Pursuing this policy, today there are 89 District Patrolmen, two Lookout Men, 535 Fire Patrolmen, (Fire Fighters) and four technical men. It is estimated that there around 7,000,000 acres in Tennessee now under as intensive fire protection as is possible to give at present. In 1925 up to November 1, 980 forest fires were reported to the office of the State Forester, on which fires there were 4,699 volunteer helpers. This will give some idea of the effect of the campaign which the selected men have secured in their fight against fires. Such fires a few years ago were left to burn unheeded, whereas now they are fought and suppressed.

The work is now conducted under a Board of Forest Conservation consisting of seven members. The Nashville Chamber of Commerce also has an organized Forestry Committee which is cooperating with this Board. There is also a very outstanding State Forestry Association and a number of cooperating County Forestry Associations.

Forest Protective organizations are being formed among private owners, both farmers and timberland owners, including lumbermen, in which the owners contribute 1 cent per acre and the State a like amount for the protection of their lands, the State taking charge of the work. Many of the civic clubs in the State, both men's and women's, are cooperating in the forestry program.

The reclamation of waste land is continued and its importance is growing throughout the State. Various kinds of publicity are used in keeping the forestry idea before the people, such as lectures, movies, newspaper articles, bulletins, exhibits at fairs, compositions and poster making in the schools etc.

Teaching of forestry in the public schools has been adopted by the State and is now a part of the public school curriculum. A text book entitled "Our Trees and How They Serve Us" has been adopted by the State Text Book Commission to fulfill the requirements of the adoption. The aims of Forestry in Tennessee are:

To secure a much more intensive fire prevention system, the present organization being too sparsely scattered to do as effective work as is necessary. This can be done only through a more adequate appropriation.

To stop forest fires eventually very largely by the consent of the people in not letting them start.

To secure adequate forest fire laws and their enforcement.

To practice more extensive farm forestry.

To inspire timber holders to grow timber.

To establish State Forests and Parks.

To secure at least four more specialists to more perfectly carry out fire prevention work, reclamation work, and to secure scientific information on the various forest problems.

To secure the maximum cooperation of private owners.

To establish county and municipal forests, the State cooperating in this way.

To establish and maintain a State Forest Nursery.

To secure and publish all information practicable about the forest resources of the State.

FORESTRY IN TEXAS

E. O. SIECKE, *State Forester*

Texas first recognized public responsibility in forestry activity in 1915 by the enactment of a forestry law creating a State Department of Forestry and placing it under the administrative control of the Board of Directors of the Agricultural and Mechanical College. From an initial appropriation of $20,000.00 for the first biennial period the support of the forestry wark has gradually increased so that the assets from State and Federal sources for the development of forestry work amount to a trifle more than $200,000.00 for the present biennial period. In 1915 the personnel of the Forestry Department consisted of two technical foresters, while at the present time the Department employs five technical foresters, four yearlong inspectors and forty patrolmen on duty for approximately seven months annually.

The development of a forest protection system was the first activity claiming our attention. This work was initiated in 1916 with eight men, while our fire protection personnel now comprises forty-five men. The area covered by organized protection work is less than half of the timbered area in Texas in need of protection from fire. Protection measures that have been developed on this area are not at all adequate. It is apparent, therefore, that greatly increased funds must be made available before a thoroughly adequate system of forest protection is developed in Texas. At the start our protection effort was largely educational in character but as the individual patrol districts were decreased in size more and more attention has been paid to actual fire suppression work. One of the encouraging features has been the increase in cooperation on the part of the lumbermen and citizens in the commercial timberbelt of the State.

A Farm Forester was employed in 1923 to assist the timberland owning farmer in the proper management of his woodland and in the marketing of his forest products. The Farm Forester also conserns himself with the stimulation of tree planting by farmers in the treeless agricultural portions of the State. Recently, an agreement was entered into, under the provisions of which the Farm Forestry work is conducted as a cooperative project between the State Forestry Department and the Texas Extension Service. It is hoped that such cooperative arrangement will enlist the active interest of the county agents and greatly enlarge the scope of the work.

Since 1923, three State Forests have been acquired, these Forests comprising an area of 5600 acres. We now have a State Forest area in each of the principal timbered types in the commercial region. One of these areas is now being put under administration. A home for the superintendent has been erected thereon and the Forest is being fenced so as to exclude the razorback hog. Demonstration work is under way and it is hoped that in a few years our work on this area will produce information of value to the owners of cut-over land. The other State Forests will be put under administration as soon as funds for this purpose are secured.

Recognizing that the education of the average citizen along forestry lines is the corner stone upon which forestry progress will rest, the Texas Forestry Department has emphasized forestry educational work wherever possible. Special bulletins have been given wide distribution, feature articles and shorter press bulletins prepared by the Department have been used effectively by the Texas press. In fact the newspapers of Texas have been ardent supporters of all efforts pointing towards forestry progress.

This Department has, during the past eight years, followed the policy of enlisting all classes of citizens and industries interested in a correct solution of our forestry problems. The lumberman, as well as the farmer and business man, in the commercial timberbelt is interested in the adoption of a forestry program that will encourage reforestation and one that will be just and equitable to public as well as private interests. It was felt that, since all of these citizens were interested in the arriving at one solution, there was no real reason why all should not work together. I believe that this policy has paid big dividends.

The chief obstacle preventing the realization of our forestry objectives in Texas is the lack of proper forest taxation legislation. Unfortunately, it seems that an amendment to our constitution will be required in order to give our Legislature authority to enact desired taxation laws. During 1925 a joint resolution, submitting a forestry constitutional amendment to our citizenship, was passed by the Texas Senate and would have passed the House. However, it was felt that two additional years of general educational work might precede the submission of this amendment and, therefore, the final passage of the resolution was not pushed. A similiar resolution will be presented to the Legislature meeting in 1927 and a forestry constitutional amendment will, no doubt, be voted upon by our citizens during that year.

FORESTRY IN WEST VIRGINIA

A. B. BROOKS, *Chief Game Protector*

Becoming alarmed at the huge losses incurred annually by forest fires throughout our State, timber-land owners and coal operators holding bodies of timber organized forest fire protection associations in 1908. This first attempt met with first one difficulty and then another so that effective measures of control were not very productive of real results. This organization dwindled down to practically nothing while the problem and damages increased in size.

In 1919 a body of business men who saw that these same fires were rapidly depleting their hunting and fishing grounds banded together in an organization known as the Wild Life League of West Virginia. Branches were established throughout the State at various points. Together with the land owners and coal operators who were originally interested in fire preventive means, it was possible to secure the passage of the present measure that brought the Game and Fish Commission into being. This organization is supported entirely from the revenue collected by the Game and Fish Commission in hunting licenses and not by any direct levies.

Realizing that protection from fire was a vital necessity, provision was made in this measuer that 25 per cent of the income be spent for fire protection. This amount plus one cent per acre levy on the land owner went to offset federal appropriations under the Weeks law and the Clarke-McNary Act. Another phase of the law provided that from unused funds collected by the Game and Fish Commission forest lands could be acquired and this has been carried on from time to time. Operationg under this Act from a forestry standpoint the Commission has begun certain undertakings and has met with very good success.

1. The Commission has endeavored to foster close cooperation with the U. S. Forest Service under the Weeks law and the Clarke-McNary Act.

2. The Commission has endeavored to establish the best of cooperation with the two existing forest fire protective associations now organized in the State, namely, the Southern and the Central.

3. The Commission has endeavored to maintain close cooperation with the timber owners and coal operators, as well as the sportsmen of the State who stand solidly behind all conservation work now being car-

ried on within the State. It has been these interests that have been leaders in obtaining good amendments to the Forest Protective Act. It was largely through their efforts that the present State-wide forest fire patrol Act based very largely on the Oregon Act became a law during the 1925 session of our Legislature. Under this law which has been in operation less than six months, 1,380,000 acres of land has been listed for protection, bringing the total of our protected area up to better than 4,000,000 acres. This means that half of our area needing protection is now being covered.

4. The Commission has purchased two State Forests containing a total of 16,000 acres.

5. The Commission has built up a forest fire fighting organization consisting of one chief forest fire warden, 4 district rangers, 86 rangers, 28 observers, 540 local forest fire wardens.

6. The Commission has built 19 forest fire towers and 8 wooden towers, 260 miles of telephone line conforming to U. S. Forest Service standards.

7. The Commission maintains the very closest kind of cooperation with the Agricultural Division of the State University aiding very materially in the work of the extension foresters employed there.

At the 1925 session of the State Legislature there was created a State Forest, Parks and Conservation Commission which is to act in an investigative capacity ascertaining what agencies are at work along conservation lines within the State, and ascertaining what is needed and upon the phases of their findings report to the 1927 Legislature proposed measures looking to the establishment of adequate means of administering all phases of the conservation field.

To date there are no forestry projects underway from a State standpoint except those which are being carried on by foresters employed by several of the large companies operating timber tracts within the State. These men are doing much work of both a scientific and distinctly a practical nature.

REPORT OF THE TREASURER

Receipts	
Balance from former Secretary-Treasurer	$ 1,086.73
Contributions from Patrons:	
Arkansas	$ 500.00
Louisiana	200.00
Mississippi	20.00
Missouri	135.00
South Carolina	100.00
Virginia	160.00
	$ 2,201.73
Disbursements	
Stenographical work	$ 75.70
Stationery and Supplies	110.46
Little Rock Meeting	108.39
Printing and Forwarding:	
Sixth Proceedings	284.36
Seventh Proceedings	493.40
	$ 1,072.31
Balance on Hand, February 10, 1926	$ 1,129.42

W. K. Williams, Jr., Secty.-Treas.

RESOLUTIONS ADOPTED BY THE JOINT MEETING

1. PASSING OF BOLLING ARTHUR JOHNSON AND ROSE SHUMATE JOHNSON.

We pause in deep respect and in heartfelt appreciation of Bolling Arthur Johnson and Rose Shumate Johnson, husband and wife, who together have passed from earthly activities. We strongly sense the loss of these personalities. We feel the gap they leave unfilled. They were friends of forestry and our co-workers. In opening the columns of their journal, "The Lumber World Review," to a friendly discussion of the entire reforestation question they furnished a medium that greatly aided in bringing foresters and lumbermen together on common ground in support of nation-wide reforestation and, in their death, the friends of forestry have lost two of their strongest advocates.

Resolved that a copy of these resolutions be sent to the associates of Bolling Arthur Johnson and Rose Shumate Johnson, on "The Lumber World Review" and to the Forestry Press.

2. PASSING OF PROFESSOR FILIBERT ROTH.

We extend profound sympathy to the wife and daughter of Filibert Roth, accomplished Forester and leader among us, long time teacher of Forestry at Cornell and at Michigan, Director of the Michigan University Department of Forestry, patient, faithful teacher, accomplished scholar, bold leader, warm-hearted friend.

3. WORLD-WIDE SURVEY OF FOREST RESEARCH.

Whereas. the economic advancement of the world has been largely dependent upon the results of scientific research, and,

Whereas, the solution of many important forest problems is dependent upon further forest research, be it, therefore,

Resolved, that the American Forestry Association and the Southern Forestry Congress unqualifiedly endorse the plans of The National Academy of Science for a world-wide survey of forest research as an aid to the advancement of forest research in this country and that we earnestly bespeaek for this project the support of all persons and organizations working toward a solution of our forest problems.

4. PRACTICE OF FORESTRY BY PRIVATE OWNERS.

Whereas, the wood using industries of the United States are dependent for their continuous operation upon a permanent supply of reasonably priced raw material, and,

Whereas, a few far-sighted lumber, pulp and paper and other wood using companies, have appreciated the opportunities for continuous forest production under systems of practical forest management, be it, therefore,

Resolved, that the American Forestry Association and the Southern Forestry Congress in joint convention assembled, do express their gratification at the progressive leadership of such executives toward a solution of the raw material and forest problems of this country by the application of the principles of forest management to their own timber lands, and be it further,

Resolved, that these organizations bespeak the active cooperation of Federal Government, State Governments and other political, industrial and economic bodies, in making possible the expansion of such practice for the ultimate benefit of the wood using industries, and the people of the United States.

5. FORESTRY EDUCATIONAL ACTIVITIES.

Whereas, we believe that the people of this country, both children and adults, must be made to realize the need of protecting our forests from fire before the prevention of forest fires can effectively becarried out, therefore, be it,

Resolved, that we heartily endorse the educational campaign that the American Forestry Association has undertaken to inform the people of the country of the need of forest fire prevention and that we urge all individuals and organizations to support this work, and be it further,

Resolved, that we commend and endorse the educational work in the interest of forestry that is being carried on by the Boy Scouts, under the leadership of Daniel Carter Beard, National Scout Commissioner, and also the educational work of Mrs. Frances E. Whitley, of the General Federation of Women's Clubs.

6. FORESTRY FACT-FINDING SURVEYS.

Resolved, that we urge the States promptly to undertake fact finding surveys, with the view of determining the forest situation within their borders and to the end that comprehensive and adequate forestry policies may be formulated and adopted at the earliest possible date, including especially, the establishment of Forestry Departments organized on a non-political basis, the inauguration of effective educational and publicity campaigns, the creation of fire protection systems, the adoption of equitable methods of forest taxation, the acquisition of lands for State Forests, aid to private owners in the proper management of their forests, the distribution of forest planting stock, and especially appropriations that are adequate to enable the States to qualify completely for the increased Federal aid, which is sure to be made available under the Clarke-McNary Act; and we further urge the four Southern States of South Carolina, Florida, Mississippi and Arkansas to enact, at the next sessions of their General Assemblies, appropriate legislation in this direction.

7. PRESERVATION OF TYPICAL REDWOOD AREAS.

Resolved, that inasmuch as the few remaining areas of Coast Redwood most valuable for their beauty, for scientific study and for recreation are in imminent danger of destruction, and since the perpetuation of this unique type of ancient tree life should be a matter of patriotic pride, we heartily commend the efforts of the "Save the Redwoods League" to acquire these representative tracts and to preserve them for future generations.

8. NATIONAL ARBORETUM.

Whereas, a measure is now before Congress providing for the establishment of a National Arboretum near Washington, D. C., to enable our citizens to increase their knowledge of trees and tree growth and to provide opportunities for our scientists to supplement existing information on forestry, therefore be it,

Resolved, that the joint meeting of the American Forestry Association and the Southern Forestry Congress urges the passage of this bill, together with sufficient appropriation to adequately inaugurate this commendable project.

9. PROTECTION OF IMPORTANT WATERSHEDS.

Whereas, an adequate and continuing water supply for domestic, irrigation and hydro-electric development purposes is necessary to insure the economic integrity of all sections of the United States, therefore, be it,

Resolved, that the American Forestry Association and Southern Forestry Congress favor such appropiation by the National Congress, which is authorized by the Clarke-McNary Act, as may be necessary to protect from fire the forest and brush covered areas constituting watersheds from which water is secured for the purposes above set forth—as in Southern California and Texas, where the same water is used for all three purposes and is a vital necessity in the production of fruit and other agricultural products used throughout the nation, and be it further,

Resolved, that the secretaries of the two Associations are instructed to send a copy of this resolution to all members of Congress.

10. INCREASE OF FEDERAL APPROPRIATIONS UNDER CLARKE-McNARY LAW.

Whereas, our population is increasing and our timber supply is decreasing, and,

Whereas, Congress in the Clarke-McNary law has granted ample authority for further acquisition of forest lands in National forests and for cooperation with the States in preventing the enormous annual losses from forest fires, amounting annually to many millions of dollars, and,

Whereas, the agents of Congress, namely. the Budget Commissioner and the Agricultural Sub-Committee of Appropriations in the House repeatedly have ignored our statements and appeals, as we believe in a spirit of false economy, neglecting adequately to provide for the maintenance and re-establishment of a fundamental natural resource, the forest, and, Whereas, we bieleve the present situation constitutes an emergency affecting the welfare of our people everywhere, therefore, be it

Resolved, that we, the American Forestry Association and the Southern Forestry Congress. in joint annual session at Richmond, Virginia, appeal to the members of Congress to enlarge at this session of Congress the sums that have been recommended by the Budget Commissioner from one million dollars for the acquisition of forest land to three million dollars, and from six hundred and sixty thousand dollars for co-operation with the States in the prevention and suppression of forest fires to one million five hundred thousand dollars, as recommended respectively by the National Forest Reservation Commission and the United States Forest Service, and be it further,

Resolved, that we earnestly urge the adoption of the ten year fiscal program for the Federal acquisition of forest land as embodied in the McNary-Woodruff bill now pending, and, be it further,

Resolved, that copies of this resolution be sent ao all members of Congress, to all members of our two societies, to forestry and conservation associations throughout the country, to the press and to such other persons as the secretaries of the associations shall approve.

II. GRAZING POLICY ON NATIONAL FORESTS.

Whereas, certain representatives of the grazing industry in the west, in written recommendation submitted to the special investigation committee of the Senate Public Lands Committee, are advocating radical changes in the administration of the National Forests. and,

Whereas, these proposals would be destructive to the administration of the National Forests and the public interests which they serve in that, if enacted into law, the whole plan of National Forest Conservation—range, timber, water, wild life, recreation, will be shattered on 90,000,000 acres of public lands and the National of the Federal Government developed during the past twenty years and representing the greatest conservation achievement of the American people, will be rendered largely ineffective, and,

Whereas, the National Forests wer cratd for the primary purpose of Forest production and the conservation of the sources of the National water supply and not as grazing reserves. and,

Whereas, unregulated grazing in the forest an don forest land has been shown by the experience of older countries, such as England, France and Spain and by recent studies in this country, to be destructive of forest growth, and the conservation of soil and water, now

Therefore, The American Forestry Association and the Southern Forestry Congress meeting jointly at Richmond Virginia, on this seventh day of January, 1926, and with delegates present from every section of the United States do hereby condemn the proposal of the Western stockmen as prejudicial to the forest interests of the Nation and we place ourselves definitely on record as emphatically opposed to the legislation proposed or to any other legislation which will take from the Secretary of Agriculture authority to regulate grazing on the National Forests as forest and water conservation demand, and, be it further

Resolved, that copies of this resolution be transmitted to members of Congress.

12. UNITED STATES FOREST SERVICE.

Resolved, that the American Forestry Association and the Southern Forestry Congress meeting in joint session heartily and unqualifiedly endorse the administration of the United States Forest Service under the direction of Colonel W. B. Greeley, as being thorough, practical and satisfactory.

13. APPRECIATION.

Resolved, that we extend our thanks to the newspapers of Richmond, to the Chamber of Commerce, to the Jefferson Hotel, and to the other organizations and individuals of Richmond who have so efficiently advertised the convention and who have been so generous and courteous in providing for our entertainment and enjoyment.

Resolved, that the American Forestry Association and the Southern Forestry Congress in joint session assembled do hereby commend the action of Honorable Lee Trinkle, Governor of Virginia, for his broad and sympathetic grasp of the first needs of his State and for his definite leadership looking to the enlargement of the forest work of the State of Virginia.

REPORT OF COMMITTEE ON PLACE OF MEETING

The Committee, through its Chairman. Mr. W. D. Tyler, reported that invitations had been received from Jacksonville, Florida, and Louisville, Kentucky, and that after careful consideration the Committee, by a unanimous vote, recommends that the Ninth Southern Forestry Congress meet at Jacksonville, Florida, at a date to be selected by the Executive Committee.

The report was approved and Jacksonville, Florida, was selected as the meeting place for the Ninth Southern Forestry Congress.

REPORT OF COMMITTEE ON NOMINATIONS

The Committee on Nominations, through its Chairman, Col. Joseph Hyde Pratt, presented the names of the following members for officers of the Southern Forestry Congress.

For President: Mr. H. L. Kayton, Carson Naval Stores Company, Savannah, Georgia.

For Vice-President: Mr. R. B. Robertson, Champion Fibre Company, Canton, North Carolina.

For Secretary: Mr. E. O. Siecke, State Forester, College Station, Texas.

For Assistant Secretary: Mr. A. A. Coult. General Secretary, Florida State Chamber of Commerce, Jacksonville, Florida.

For Chairman Executive Committee: Mr. W. D. Tyler, Clinchfield Coal Corporation, Dante, Virginia.

The Committee report was adopted and the above members were thereby duly elected to fill the respective positions for th ensuing year.

The Eighth Southern Forestry Congress then adjourned.

Appendix I

PATRONS*
EIGHTH SOUTHERN FORESTRY CONGRESS

ARKANSAS

Southern Lumber Company, Warren.
Wisconsin-Arkansas Lumber Company, Malvern.
Arkansas Lumber Company, Warren.
Gates Lumber Company, Wilmar.
Freeman-Smith Lumber Company, Millville.
Edgar Lumber Company, Wesson.
Union Sawmill Co., Huttig.
Long-Bell Lumber Company. Pine Bluff.
Crossett Lumber Company, Crossett.
Halpin-Niemeyer Lumber Company, Hot Springs.

LOUISIANA

Peavy-Brynes Lumber Company, Shreveport.
Frost-Johnson Lumber Company, Shreveport.
Great Southern Lumber Company, Bogalusa.
Vernon Parish Lumber Company, Kurthwood.
Louisiana Central Lumber Company, Clarks.

MISSOURI

St. Louis Lumber Company, St. Louis.
Goodfellow Lumber Company, St. Louis.
J. H. Allen, St Louis.
Dierks Lumber Company, Kansas City.
Exchange Saw Mill Sales Company. Kansas City.
Caddo River Lumber Company, Kansas City.
Ingham Lumber Company, Kansas City.
Central Coal & Coke Company, Kansas City.
Long Bell Lumber Company, Kansas City.

MISSISSIPPI

Peoples Bank, Utica.
First National Bank, Biloxi.

SOUTH CAROLINA

H. L. Tilghman, Sellers.

VIRGINIA

Clinchfield Coal Corporation, Dante.

W. D. Tyler, Dante.

Norfolk & Western Railway Company, Roanoke.

---

*Those who have made substantial contributions towards the expenses of the Congress are termed patrons.

Appendix II

LIST OF REGISTERED DELEGATES
attending the
EIGHTH SOUTHERN FORESTRY CONGRESS
meeting jointly with
THE AMERICAN FORESTRY ASSOCIATION

Allen, Shirley W.	American Forestry Association, Washington, D. C.
Allen, Edgar P.	National Lumber Mfg. Association, Washington. D. C.
Aberly, W. F.	New Bern, North Carolina.
Allison, E. F.	Allison Lumber Company, Bellamy, Alabama.
Anderson, E. O.	Cartersville, Georgia.
Andrews, Howard	National Tie Producers Association, Nashville, Tenn.
Andrews, J. P.	Virginia Forestry Department, Charlottesville, Va.
Authier, George F.	Washington, D. C.
Ayres, Philip W.	Society for Protection of N. H. Forests, Boston. Mass.
Baker, Eugene	A. & W. P. R. R., Atlanta, Ga.
Baker, Harry Lee	U. S. Forest Service, Washington, D. C.
Barnett. W. L'E.	Florida Forestry Association, Mt. Dora, Fla.
Barrett, DuPre	State College of Agriculture, Athens, Ga.
Bazeley, William A. L.	Department of Conservation, Boston, Mass.
Beard, Daniel Carter	Boy Scouts of America. Flushing, N. Y.
Beam, W. R.	Richmond, Va.
Besley, F. W.	Maryland Department of Forestry, Baltimore, Md.
Bradford, J. H.	Virginia State Budget, Richmond, Va.
Bright, Dr. J. Fulmer	Richmond, Va.
Brooks, A. B.	W. Va. Game & Fish Commission, Buckhannon, W. V.
Brown, Otto	Alabama College of Agriculture, Auburn. Ala.
Brown, W. McCulloch	Maryland Forestry Association, Baltimore, Md.
Bruce, Rowlett. H.	Bedford Pulp & Paper Company, Chester, Va.
Bruner, E. Murray	U. S. Forest Service, Lenoir, N. C.

Bunker, Page S.	Alabama Commission of Forestry, Montgomery, Ala.
Butler, Ovid M.	American Forestry Association, Washington, D. C.
Camp, J. M.	Camp Manufacturing Company, Franklin, Va.
Camp, R. R.	Camp Manufacturing Company, Franklin, Va.
Cardwell, G. A.	Atlantic Coast Line R. R. Co., Wilmington, N. C.
Carpenter, C. W.	The Hudson Coal Company, Scranton, Penn.
Cavendish, H. A.	Tidewater Hardwood Corporation, Hot Springs, Va.
Clark, W. G.	Quinton, Va.
Cless, George H. Jr.	Chamber of Commerce, Portsmouth, Va.
Crane. Richard	Westover, Va.
Crawley, K. T.	Chesapeake & Ohio Ry., Richmond, Va.
Cox, Frank W.	Eureka Lumber Company, Washington, N. C.
Cox, W. B.	Bellaville, Va.
Coyle, Leonidas	N. J. State Department, Trenton, N. J.
Crocker, D. A.	American Paper & Pulp Association, N. Y. City.
Cuttle, Francis	California State Board of Forestry, Riverside, Cal.
Dabbs, E. W.	Mayesville, S. Carolina.
Damtoft, Walter J.	The Champion Fibre Company, Canton, N. C.
Davies, Frederick G.	Charleston, S. Carolina.
Evans, R. M.	U. S. Forest Service. Washington, D. C.
Fugnson, W. H.	Clinchfield Coal Corporation, Cleveland, Va.
Forbes. R. D.	U. S. Forest Service, New Orleans, La.
Frothingham, E. H.	U. S. Forest Service, Asheville, N. C.
Garver, R. D.	U. S. Forest Service, Madison, Wisconsin.
Gary, J. Vaughan	Member Virginia General Assembly, Richmond, Va.
Gathwright, Thos. M.	Covington, Va.
Gennett, Andrew	Gennett Lumber Company, Asheville. N. C.
Gill, Tom	American Forestry Association, Washington, D. C.
Graeber, R. W.	N. C. State College, Statesville, N. C.
Gravatt, G. F.	Bureau of Plant Industry, Washington, D. C.
Greeley, W. B.	U. S. Forest Service, Chevy Chase, Md.
Guerrant, Samuel S.	Callaway, Va.
Hine, W. R.	Conservation Department, New Orleans. La.
Homer. W. A.	Richmond, Va.
Hall, John Hopkins	Virginia Labor Commission, Richmond, Va.
Hall, S. J.	James D. Lacey & Company, Savannah, Ga.

Hall, Wm. L.	Hall, Kellogg & Company, Hot Springs, Ark.
Harris, Garrard	Birmingham News, Birmingham, Ala.
Hassinger, J. H.	Abingdon. Va.
Hassinger, L. C.	Hassinger Lumber Company, Konnarock, Va.
Hastings, A. B.	U. S. Forest Service, Washington, D. C.
Hazard, James O.	Florida Forestry Society, Gainesville, Fla.
Hedges, H. S.	Charlottesville, Va.
Hogue, Roy L.	Interior Lumber Company, Jackson, Miss.
Holmes, J. S.	Department of Conservation and Development, Raleigh, N. C.
Horsley, J. R.	Virginia Water Power Commission. Stapleton, Va.
Houghton. Augustus, S.	American Forestry Association, New York, N. Y.
James, B. O.	Richmond, Va.
Jarvis, J. R.	Philadelphia, Pa.
Jeffreys, W. H., Jr.	Jeffreys Spaulding Mfg. Co., Chase City, Va.
Johnson, J. K.	Great Southern Lumber Company, Bogalusa, La.
Jones, Chapin	Virginia Forestry Department, Charlottesville, Va.
Kelley, E. W.	U. S. Forest Service, Washington. D. C.
Kerr, Geo. F.	Geo. F. Kerr Lumber Company, Montague, Va.
Kimball, K. E.	N. C. Forestry Department, Fayetteville, N. C.
Lambert, J. W.	The New River Company, Mt Hope, W. Va.
Lambert, W. M.	W. M. Ritter Lumber Company, Johnson City, Tenn.
Lauderburn. D. E.	Brunswick, Maine.
LeMaistre, J. W.	Jackson Lumber Company, Lockhart. Ala.
Levrne, George	W. & B. Douglas Pump Company, Philadelphia, Pa.
McCarthy, E. F.	U. S. Forest Service, Asheville, N. C.
McCormick, W. C.	State Forestry Department, Raleigh, N. C.
McKay, A. D.	J. S. Hoskins Lumber Company, Tunstall, Va.
Maddox, R. S.	State Forestry Department, Nashville, Tenn.
Marckworth, G. D.	Louisiana State University. Baton Rouge, La.
Marr, R A.	Norfolk, Va.
Mattoon, W. R.	U. S. Forest Service, Takoma Park, Washington, D. C.
Maudlin, C. V.	American Forestry Association, Washington, D. C.
Meeks, B S.	Florence, S. C.
Miles. R. H.	Cartersville, Va.
Millar, A C.	Arkansas Forestry Commission, Little Rock, Ark.

[illegible]
3 6 [illegible] 11 4

Munns, E. N.	U. S. Forest Service, Washington, D. C.
Myers, R. V.	New River & Pocahontas Consolidated Coal Company, Berwind, W. Va.
O'Byrne, J. W.	V. P. I. Blacksburg, Va.
Palmore, J. G.	Provost, Va.
Palmore, S. W.	Provost, Va.
Parrish, J. Scott	Richmond Cedar Works, Richmond, Va.
Pederson, Fred C.	State Forestry Department, Charlottesville, Va.
Peters, J. G.	U. S. Forest Service, Washington, D. C.
Pfeiffer, Karl E.	Maryland Forestry Department. Baltimore, Mr.
Phillips, George R.	Oklahoma Forestry Commission, Oklahoma City, Okla.
Phillips. Wade H.	N. C. Department of Conservation & Development, Raleigh, N. C.
Porter, O. M.	American Paper & Pulp Association, New York, N. Y.
Pratt, Geo. D.	American Forestry Association, New York City.
Pratt, Joseph Hyde	American Forestry Association, Biltmore, N. C.
Prettyman, C. F.	Prettyman Lumber Company, Summerville, S. C.
Raine, John	The Meadow River Lumber Company. Rainelle, W. Va.
Reed, Geo. H.	Lynchburg, Va.
? Ringland, Arthur	Washington, D. C.
Roberts, B. L.	Richwood, W. Va.
Robertson, R. B.	The Champion Fibre Company, Canton, N. C.
Ryerson, H. S.	Los Angeles, Calif.
? Sadler, Mrs. E. H.	Richmond, Va.
? Saunders, J. R.	Richmond, Va.
Shields, H. W.	Pocahontas Coal & Coke Company, Roanoke, Va.
Siecke. E. O.	Texas Forestry Department, College Sta., Texas.
Skuce, Thomas W.	Morgantown. W. Va.
Slater, B. C.	Enfield, Va.
Starr, Ida M.	Easton, Md.
Stone, Florence H.	Southern Pine Association, New Orleans, La.
Sykes, W. H.	Smithfield, Va.
Tabb, T. Garnett	North Carolina Lumber Company, Richmond, Va.
Taylor, W. D.	Tunstall, Va.
Ten Eick, C. W.	Ft. Lauderdale, Fla.
Tilghman, H. L.	Tilghman Lumber Company, Marion, S. C.

Trenk, F. B.	Maryland Extension Service. College Park, Md.
Trigg, J. G.	Hunnwell-Ross Fibre Company, Hopewell, Va.
Tryon. Henry H.	South Carolina Extension Service, Aiken, S. C.
Tyler, Bruce P.	Clinchfield Coal Corporation, Bristol, Va.
Tyler, W. D.	Clinchfield Coal Corporation, Dante, Va.
Tyler, William D., Mrs.	Dante, Va.
Von Schrenk, Hermann	Missouri Forestry Association, St. Louis, Mo.
Wallace, Tom	Louisville. Ky.
Whitley, F. E., Mrs.	General Federation Women's Clubs, Webster City, Iowa.
Wickham, H. J.	Richmond, Va.
Wilber, C. P.	N. J. Department of Conservation & Development, Trenton, N. J.
Williams, J. C.	Camp Manufacturing Company, Franklin, Va.
Williams. J. C.	Southern Railway System, Washington, D. C.
Williams, W. K., Jr.	Crossett Lumber Company, Crossett, Ark.
Winfree, R. W.	Moseley. Va.
Wood, George L.	Baltimore, Maryland.
Wood, T. Gilbert	Norfolk & Western Railway, Roanoke, Va.
Wright, T. J., Jr.	Richmond Cedar Works, Norfolk, Va.
Wyman, Lenthall	U. S. Forest Service, Starke, Fla.

14 DAY USE
RETURN TO DESK FROM WHICH BORROWED

Forestry Library

This book is due on the last date stamped below, or
on the date to which renewed.
Renewed books are subject to immediate recall.

LD 21-32*m*-3,'74
(R7057s10)476—A-32

General Library
University of California
Berkeley

Pamphlets
Miscellaneous
797823
SD121
P3
v.18

~~Winkler~~ ~~204A Mulford~~
APR 13 1976

797823
SD121
P3
v.18
★★
UNIVERSITY OF CALIFORNIA LIBRARY